

JU-1/HS-10

(αJUNO-1)

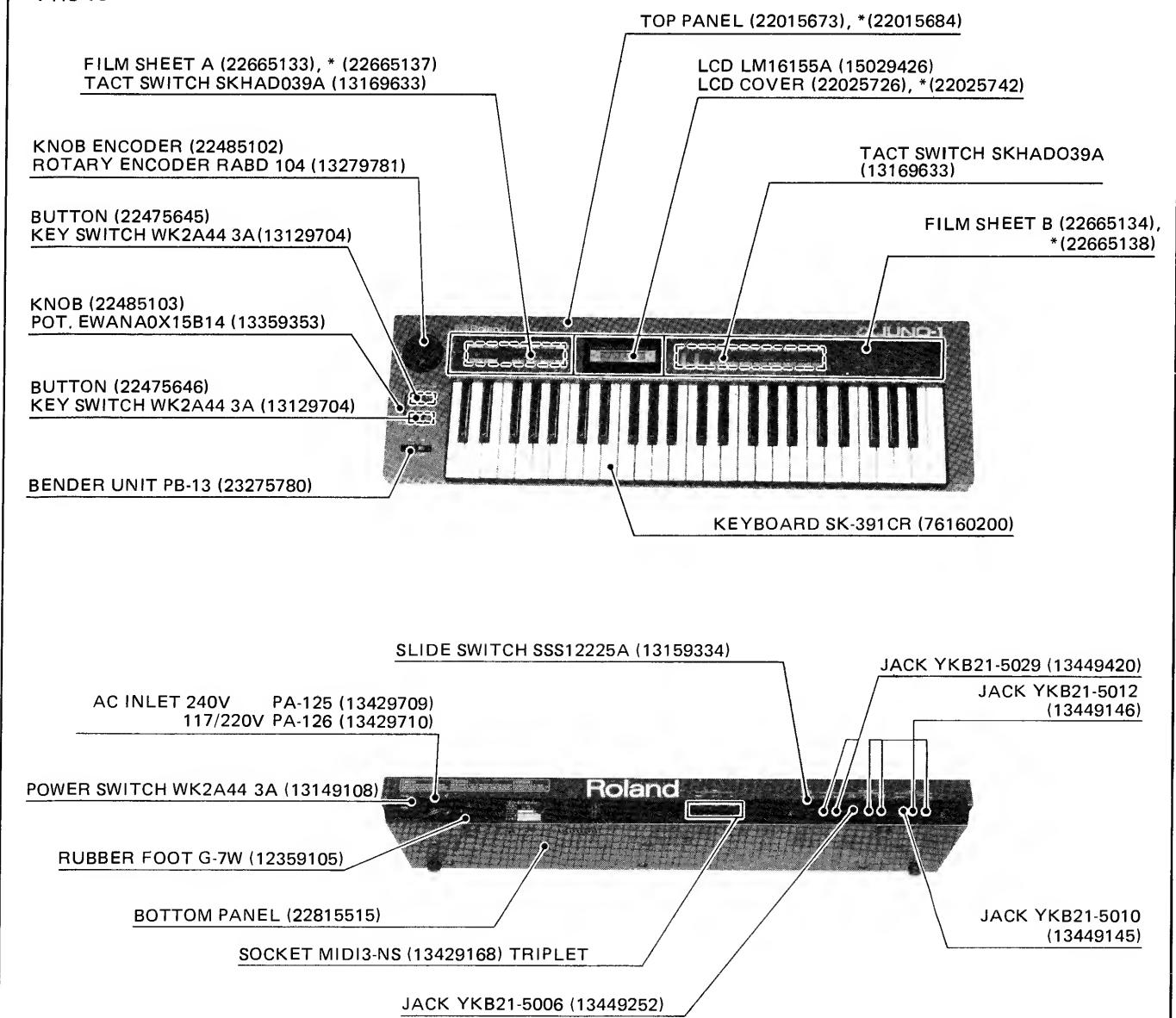
SERVICE NOTES

First Edition

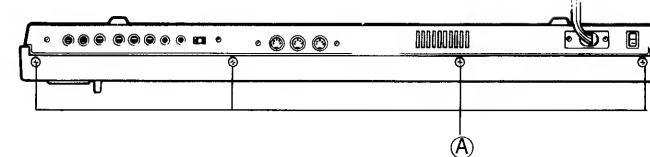
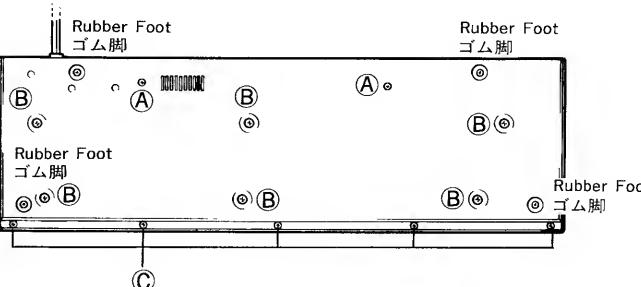
SPECIFICATIONS

KEYBOARD	49 keys, 4 octaves, C scale
DCO	TUNE ±50 cents LFO MOD ±400 cents ENV MOD ±3200 cents AFTER ±400 cents BENDER ±1200 cents
VCF	CUTOFF FREQ. 8Hz to 33kHz -24dB/oct. ENV MOD ±12 oct LFO MOD ±6 oct AFTER ±6 oct KEY FOLLOW 0 - 100%
ENV	T1 4 ms - 30 s T2 4 ms - 30 s T3 8 ms - 30 s T4 8 ms - 30 s

ERRATA & SUPPLEMENT is attached at the end of the page.

PHOTO: JU-1
*: HS-10

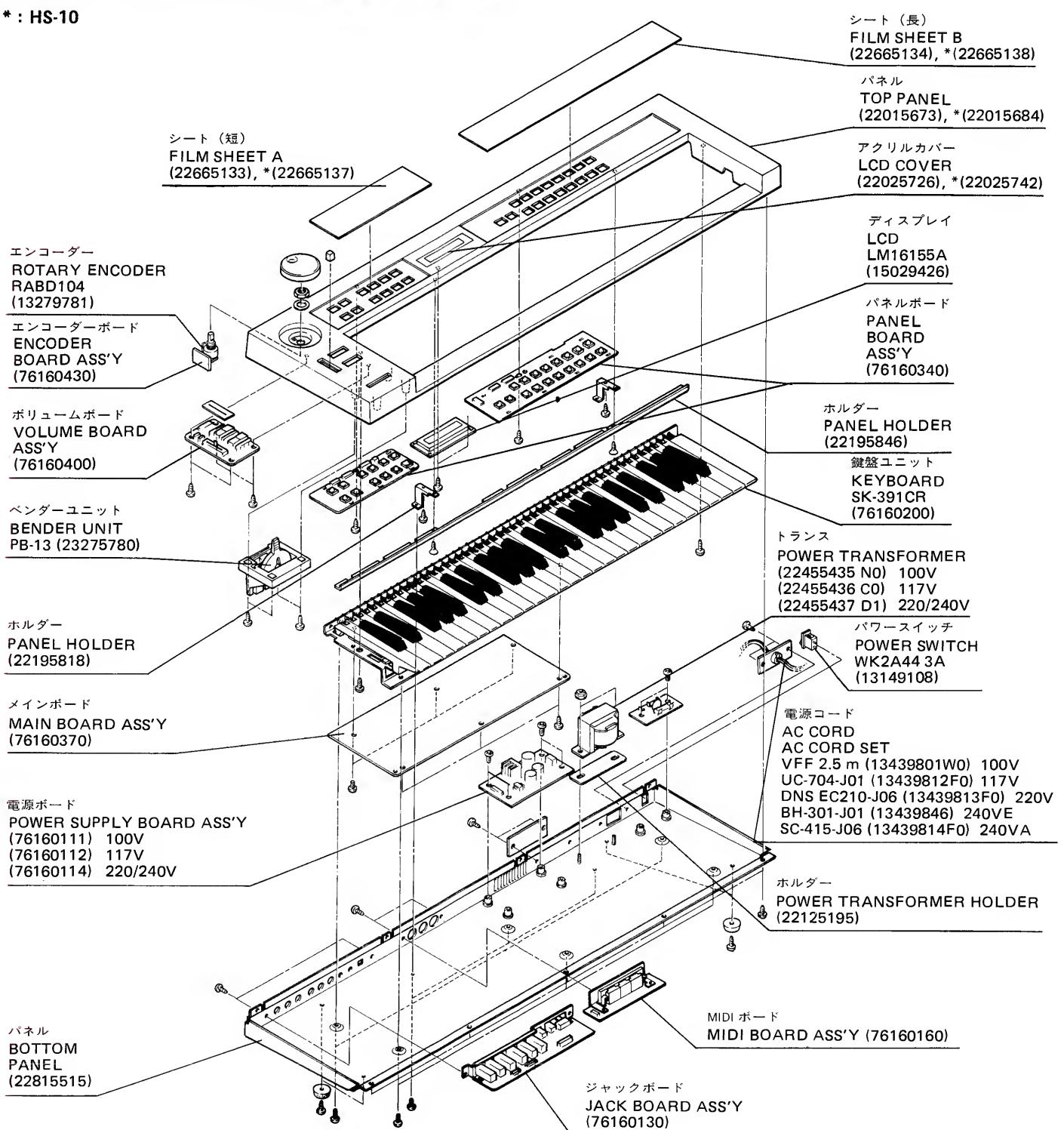
DISASSEMBLY PROCEDURES/分解手順



- (A) 3 x 8 mm TAPPING SCREW Fe BLK
- (B) 4 x 8 mm BINDING SCREW Fe BLK
- (C) 3 x 6 mm P TIGHT SCREW Fe BLK

EXPLODED VIEW/分解図

*: HS-10



PARTS LIST

PANEL

22015673	Top (JU-1)
22015684	Top (HS-10)
22815515	Bottom

HOLDER

22195817	Main Board
22195821	LED
22195816	Jack
22195819	MIDI
22195818	Panel (foot)
22195846	Panel (bar)
22125195	Power Transformer

COVER

22025726	LCD (JU-1)
22025742	LCD (HS-10)
22665133	Film Sheet A (JU-1 left)
22665137	Film Sheet A (HS-10 left)
22665134	Film Sheet B (JU-1 right)
22665138	Film Sheet B (HS-10 right)
22245447	Slide Pot

KNOB, BUTTON

22475645	Button	NORMAL, DOWN
22475646	Button	PORTAMENTO, CHORD MEMORY
22485103	Knob	VOLUME
22485102	Knob	ENCODER

SWITCH

13169633	SKHHADO39A	Tact
13159334	SSSP12225A	Slide
13129704	SKHCAB131A	Key
13149108	WK2A44 3A	Power

PCB ASS'Y

76160111	(PCB 2292525100)	Power Supply Board 100V
76160112	(PCB 2292525100)	Power Supply Board 117V
76160114	(PCB 2292525100)	Power Supply Board 220/240V
76160370	(PCB 2292525002)	Main Board
76160340	(PCB 2292525200)	Panel Board
76160400	(PCB 2292525200)	Volume Board
76160430	(PCB 2292525200)	Encoder Board
76160160	(PCB 2292525200)	MIDI Board
76160130	(PCB 2292525200)	Jack Board

JACK

13449420	YKB21-5029	SAVE, LOAD
13449146	YKB21-5012	OUTPUT, HOLD PEDAL
13449252	YKB21-5006	FOOT CONTROL
13449145	YKB21-5010	PHONES

SOCKET

13429525	IS28BOBCT	28Pin ROM
3429709	PA-125	AC Inlet 240v
13429710	PA-126	AC Inlet 117/220v
13429168	MIDI3-NS	5P Triplet DIN

CONNECTOR

13439260	5267-03A	3P
13439261	5267-04A	4P
13439262	5267-05A	5P
13439263	5267-06A	6P
13439264	5267-07A	7P
13439265	5267-08A	8P
13439266	5267-10A	10P
13439309	5138-14APB	14P
13439274	5268-09A	9P
13439306	5566-06A	6P

Volume Board
Power Supply Board

FUSE

12559104	SGA-0.5A	500mA	100V
12559342	GGS-0.3A	300mA	117V
12559504	CEE-100mAT	T100mA	220/240V

RESISTOR ARRAY

13919146	RKM14L503F	R-2R
13919334	RM1S 10-153J	15K × 10
13919312	RM1S 8-153J	15K × 8
13919165	RM1S 7-333J	33K × 7
13919166	EXB-G810860S	VCF/VCA

POSISTOR

15229923	ERS-A33J 561	560 Ohm
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POTENTIOMETER

(SLIDE)			
13359353	EWA-NAOX15B14	10KB × 2	VOLUME
(TRIMMER)			
13299197	EVN-D4AA00B15	100KB	VCF FREQUENCY

POWER TRANSFORMER

22455437D0		220/240V
22455436C0		117V
22455435N0		100V

DIODE

15029178	GL-1HD102 LED	KEY TRANPOSE
15029152	GL-9HD12 LED	DOWN, NORMAL, PORTAMENTO, CHORD MEMORY
15019245SN	S1VB10	Rectifier
15019254	2B4B41	Rectifier
15019208	1SR35-200	100V/1A

PHOTO COUPLER

15229706S0	PC-910
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IC

15179237	P8032AH	CPU
15179317	TC5517APL	RAM
15179729	M5L27128K-2	EP-ROM (JU-1)
15179756	M5L27128K-2	EP-ROM (HS-10)

*ROMのラベルに「U」マークが有る場合には、そのむね明記してください。

NOTE: When ordering ROM for IC10 check the existing ROM label for a letter "U". If fund, state so in the order sheet for a correct ROM.

15229835	MB87123P-G	DCO
15229834	MB62H195PF-G-BND	Gate Array
15229826	IR3R05	VCF-VCA
1		

CAPACITOR

13639176S0	25MV3300HA	3300μF/25V	
13639194S0	35MV1000HA	1000μF/35V	
13529128	DD107CH680J 50V	68pF	Temperature Compensating

CAPACITOR ARRAY

13529127	B8ZC0111-32N	8200P × 7
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TRANSISTOR

15129107	2SC945Q	
15139125	2SK381C	FET
15129113	2SC1740-R	
15129136	2SC2878-A	
15119106DR	2SA933-R	

AC CORD, AC CORD SET

13439801W0	VFF2.5m	100V
13439812F0	UC-704-J01	117V
13439813F0	DNS EC210-J06	220V
13439846	BH-301-J01	240V England
13439814F0	SC-415-J06	240V Australian
12369504	SR-4N-4	Cord bushing 100V
22195744	219-744	Cord holder 100V

MISCELLANEOUS

13279781	RABD104	Rotary Encoder
12569149S0	CR2032-T12	Lithium Battery 3V
12449265	ELE-H102KA	1mH Coil
22195616		Music Rest
12389746	HC-49/U	12MHz Xtal
12449552	D32-45	EL Inverter Transformer
12469139	16PC16	Heat Sink
15029426	LM16155A	LCD
23275780	PB-13	Bender Unit
12359105	G-7 W	Rubber Foot
15029429	NEL-5L-249-W	Electro Luminescent Lighting

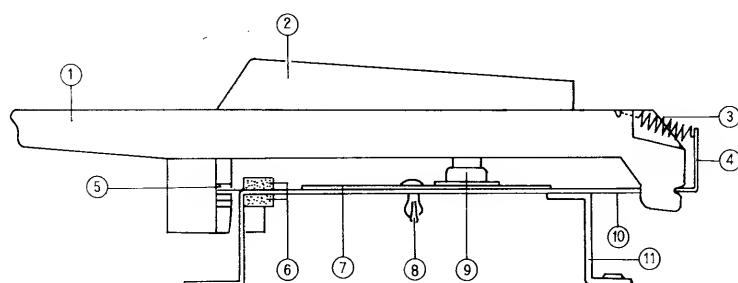
COMMERCIALLY AVAILABLE

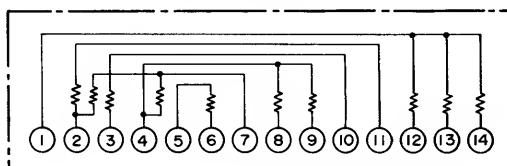
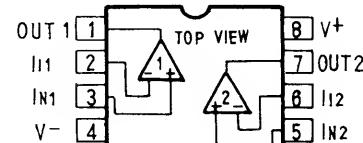
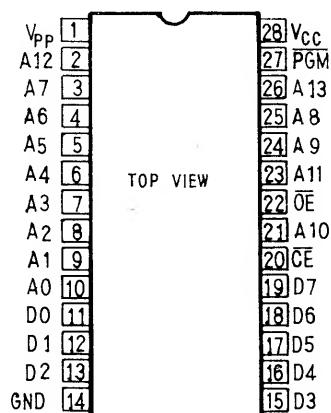
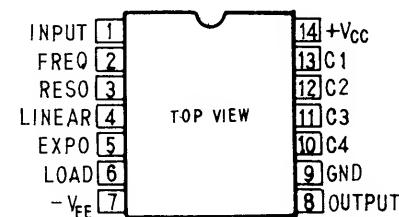
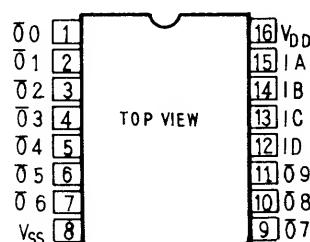
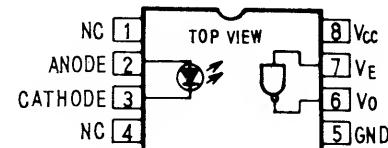
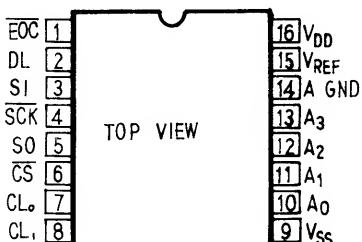
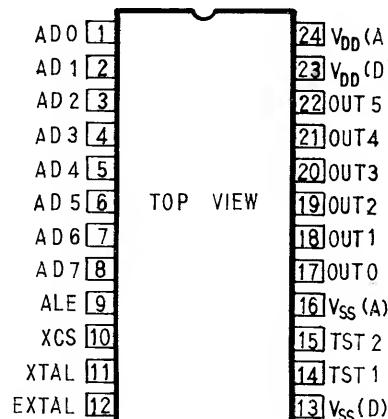
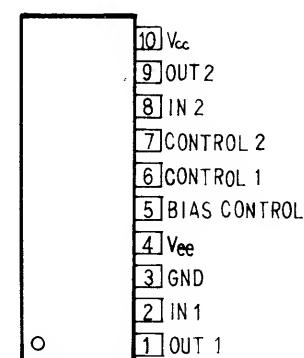
J23430675S0	LP-25	(2.5m)	Connection Cord
	MSC-25	(2.5m)	MIDI/Sync Cable
	MSC-50	(5m)	MIDI/Sync Cable

KEYBOARD

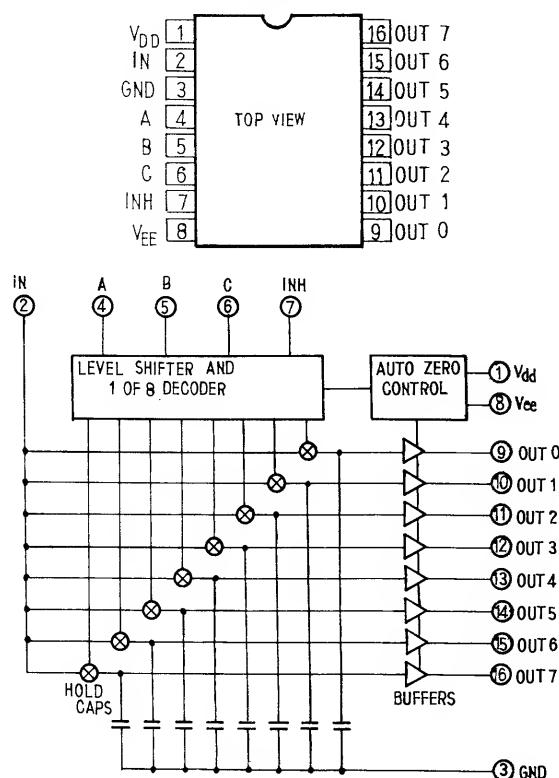
76160200	SK-391CR	49 keys
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1	22575136	NATURAL KEY C, F	5	22155716	GUIDE BUSHING
	22575137	NATURAL KEY D	6	22265146	LEVEL FELT H143
	22575135	NATURAL KEY E, B	7	22915816	JX-3P PCB (32P) LOW
	22575138	NATURAL KEY G	8	22925236	KEY SWITCH PCB (17P) HI
	22575134	NATURAL KEY A	9	22185207	NYLON RIVET (NRP-345)
	22575139	NATURAL KEY C'	10	22185208	CONTACT RUBBER (12P)
2	22575140	SHARP KEY	11	22135406	CONTACT RUBBER (13P)
3	22175132	KEY SPRING H29			KEY STOPPER H6
4	22815511	CHASSIS H140			CHASSIS BRACKET

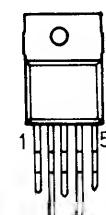


IC DATA**EXB-G810860****4570****27128****3R05****40H042****PC910****7001****MB87123****5241**

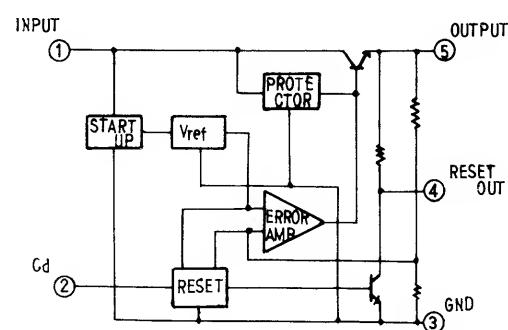
7302



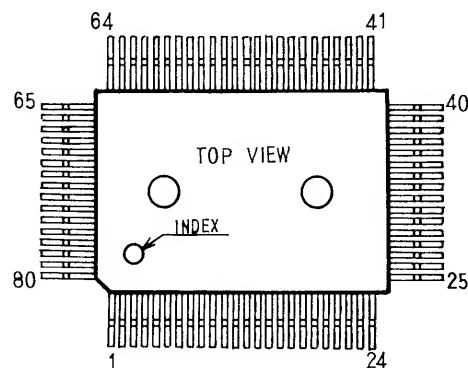
78MR05



1 INPUT
2 DELAY CAPACITOR
3 GND
4 RESET OUTPUT
5 OUTPUT



MB62H195

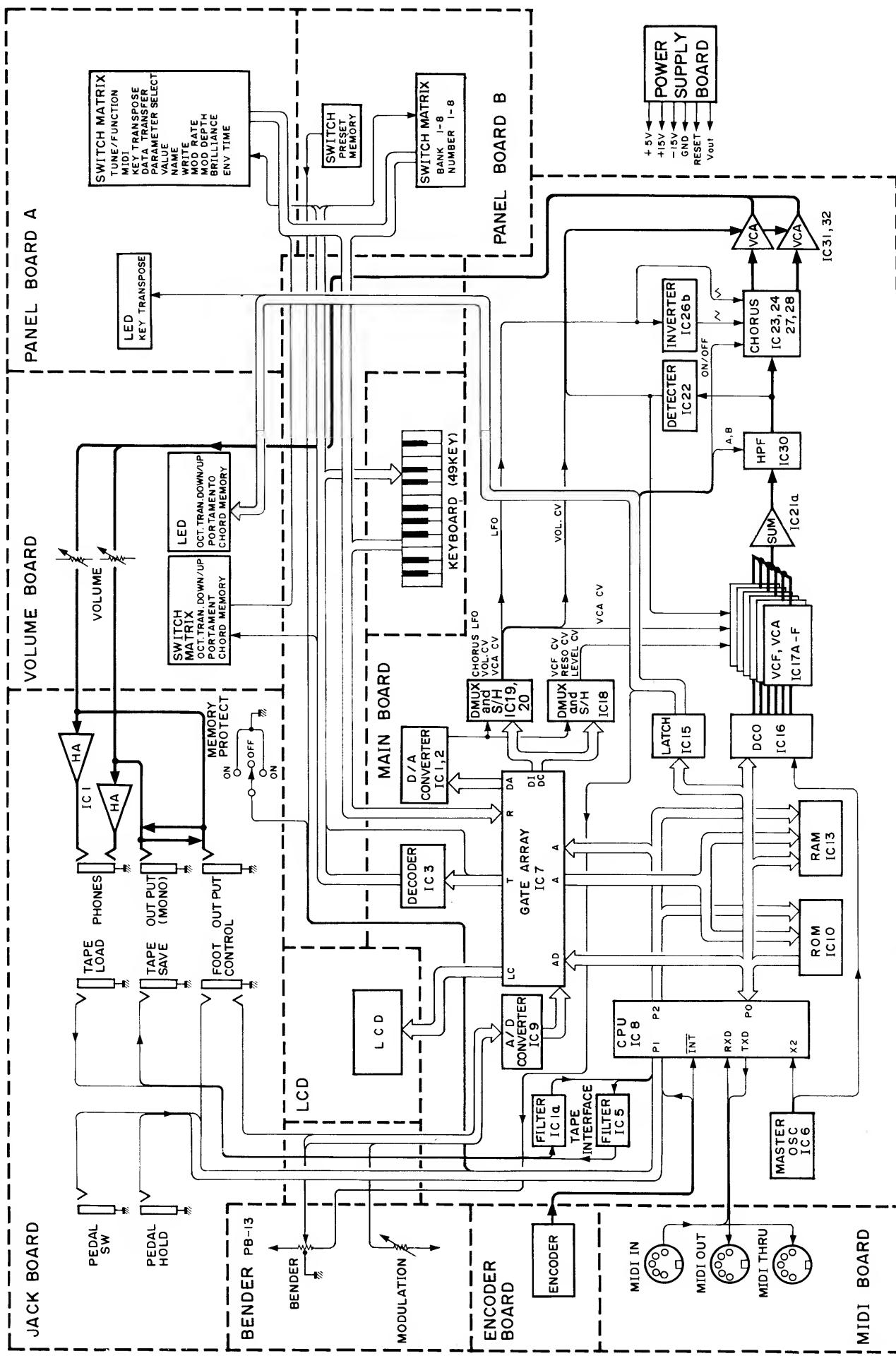


No.	\bar{V}_0	Name									
1	0	DA 7	21	0	T 3	41	1/0	AD 0	61	0	D10
2	0	DA 6	22	0	T 4	42	0	A 0	62	0	DC2
3	0	DA 5	23	/	NC	43	0	A 1	63	/	NC
4	0	DA 4	24	0	T 5	44	0	A 2	64	0	DC1
5	0	DA 3	25	0	LED	45	0	A 3	65	0	DC0
6	0	DA 2	26	1	WR	46	0	A 4	66	0	RS
7	0	DA 1	27	1	RD	47	0	A 5	67	0	LCE
8	0	DA 0	28	1	A 12	48	0	A 6	68	0	LC0
9	1	R 0	29	1	A 13	49	0	A 7	69	0	LC1
10	1	R 1	30	1	A 14	50	0	ROM	70	0	LC2
11	1	R 2	31	1	A 15	51	0	RAM 1	71	0	LC3
12	—	V _{ss}	32	1	ALE	52	—	V _{ss}	72	0	LC4
13	1	R 3	33	—	V _{DD}	53	0	RAM 2	73	—	V _{DD}
14	1	R 4	34	1/0	AD 7	54	0	DC0	74	0	LG5
15	1	R 5	35	1/0	AD 6	55	0	OUT 0	75	0	LG6
16	1	R 6	36	1/0	AD 5	56	0	ADC	76	0	LG7
17	1	R 7	37	1/0	AD 4	57	1	SIN	77	0	DA11
18	0	T 0	38	1/0	AD 3	58	0	SCK	78	0	DA10
19	0	T 1	39	1/0	AD 2	59	0	SOUT	79	0	DA 9
20	0	T 2	40	1/0	AD 1	60	0	D11	80	0	DA 8

8032

T 2 / P 1,0	1	V _{CC}
T2EX / P1,1	2	P0.1 / AD0
P1,2	3	P0.2 / AD1
P1,3	4	P0.3 / AD2
P1,4	5	P0.4 / AD3
P1,5	6	P0.5 / AD4
P1,6	7	P0.6 / AD5
P1,7	8	P0.7 / AD6
RST / VPD	9	P0.8 / AD7
RXD / P30	10	EA
TXD / P3,1	11	ALE
TINT0 / P3,2	12	PSEN
TINT1 / P3,3	13	P2.7 / A15
T0 / P34	14	P2.6 / A14
T1 / P35	15	P2.5 / A13
WR / P36	16	P2.4 / A12
RD / P37	17	P2.3 / A11
XTAL 2	18	P2.2 / A10
XTAL 1	19	P2.1 / A9
V _{SS}	20	P2.0 / A8

BLOCK DIAGRAM



CIRCUIT DESCRIPTION/回路説明

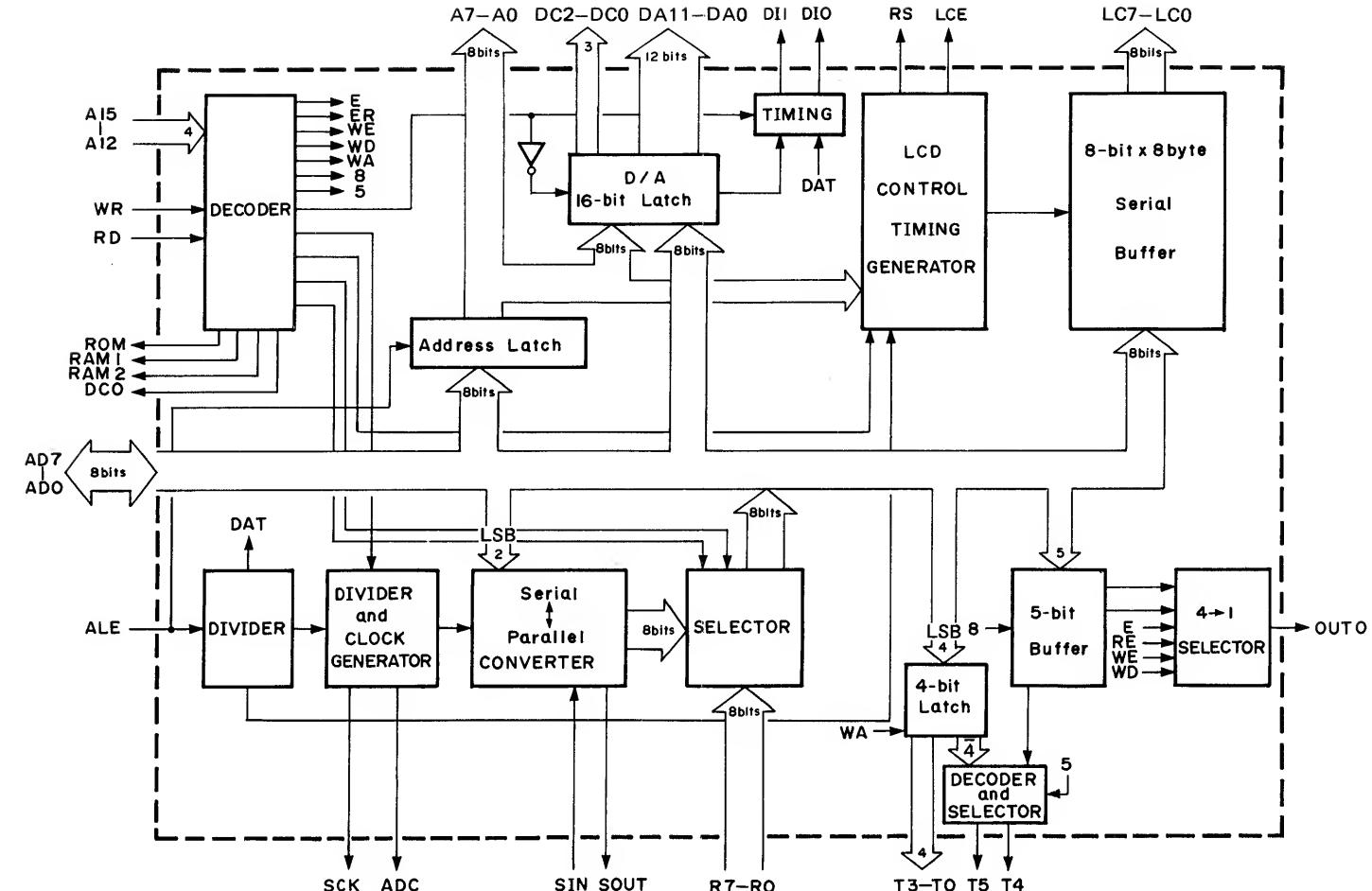
DESIGN-NATION	PIN NO.	FUNCTION	I/O
P0 (Data Bus)	7 32	ROM	I/O
	6 33	RAM	I/O
	5 34	GATE ARRAY	I/O
	4 35	DCO	I/O
	3 36		I/O
	2 37	Address	I/O
	1 38	Data	I/O
	0 39		I/O
P1	7 8	SAVE (Serial Data OUTPUT for CMT)	O
	6 7	ENCODER Direction INPUT	I
	5 6	PROTECT SW READ	I
	4 5	FVR SW CONNECTION READ	I
	3 4	PEDAL HOLD READ	I
	2 3	PEDAL SW READ	I
	1 2	MEMORY SW READ	I
	0 1	PRESET SW READ	I
P2	7 28		O
	6 27	GATE ARRAY	O
	5 26	Address	O
	4 25	ROM Address	O
	3 24	RAM Address	O
	2 23		O
	1 22		O
	0 21		O
P3	7 17	RD: RAM, GATE ARRAY READ PULSE	O
	6 16	WR: RAM, GATE ARRAY WRITE PULSE	O
	5 15	T1: NOT USED	I
	4 14	TO: LOAD (Serial Data INPUT from CMT)	I
	3 13	INT1: ENCODER TRIG INPUT	I
	2 12	INT0: NOT USED	I
	1 11	TXD: MIDI SERIAL OUTPUT	O
	0 10	RXD: MIDI SERIAL INPUT	I
RST	9	RESET PULSE INPUT	I
X2	18	CLOCK INPUT	I
X1	19		I
Vss	20	GND	
PSEN	29	READ PULSE FOR ROM ONLY	O
ALE	30	ADDRESS LATCH PULSE	O
EA	31	EXT ROM MODE (LOW)	I
Vcc	40	+5V	

<Table 1 CPU IC8 Pin Designation >

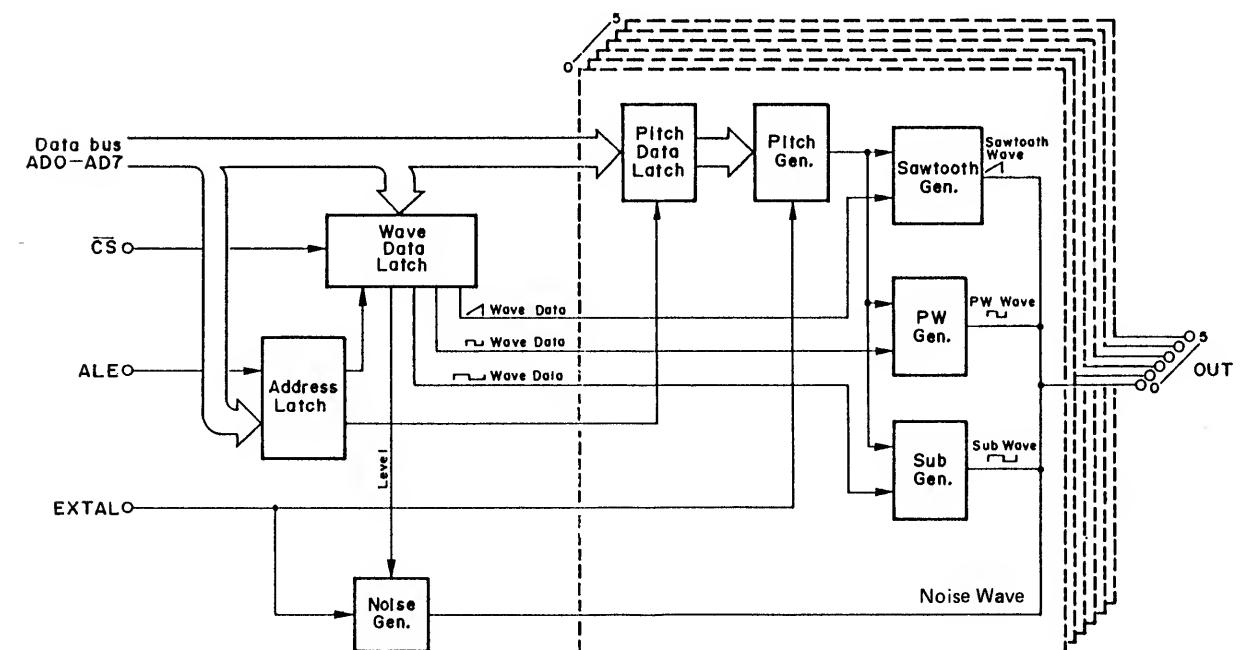
DESIGN-NATION	PIN NO.	FUNCTION	I/O
AD	0 1		I
	1 2		I
	2 3		I
	3 4	DCO DATA INPUT (8 bits)	I
	4 5		I
	5 6		I
	6 7		I
	7 8		I
OUT	0 17	Ach	O
	1 18	Bch	O
	2 19	Cch	O
	3 20	Dch	O
	4 21	Ech	O
	5 22	Fch	O
ALE	9	ADDRESS LATCH PULSE INPUT	I
CS	10	CHIP SELECT INPUT	I
EXTAL	11	MASTER CLOCK INPUT	I
XTAL	12	NC	O
TST	1 14	GND	I
	2 15		I
VS	13	Digital GND	I
VS	16	Analog GND	I
VD	23	Analog +5V	I
VD	24	Digital +5V	I

<Table 3 DCO IC16 Pin Designation >

<Table 2 Gate array IC7 Pin Designation >



<Fig. 1 Gate array IC7 Block Diagram >



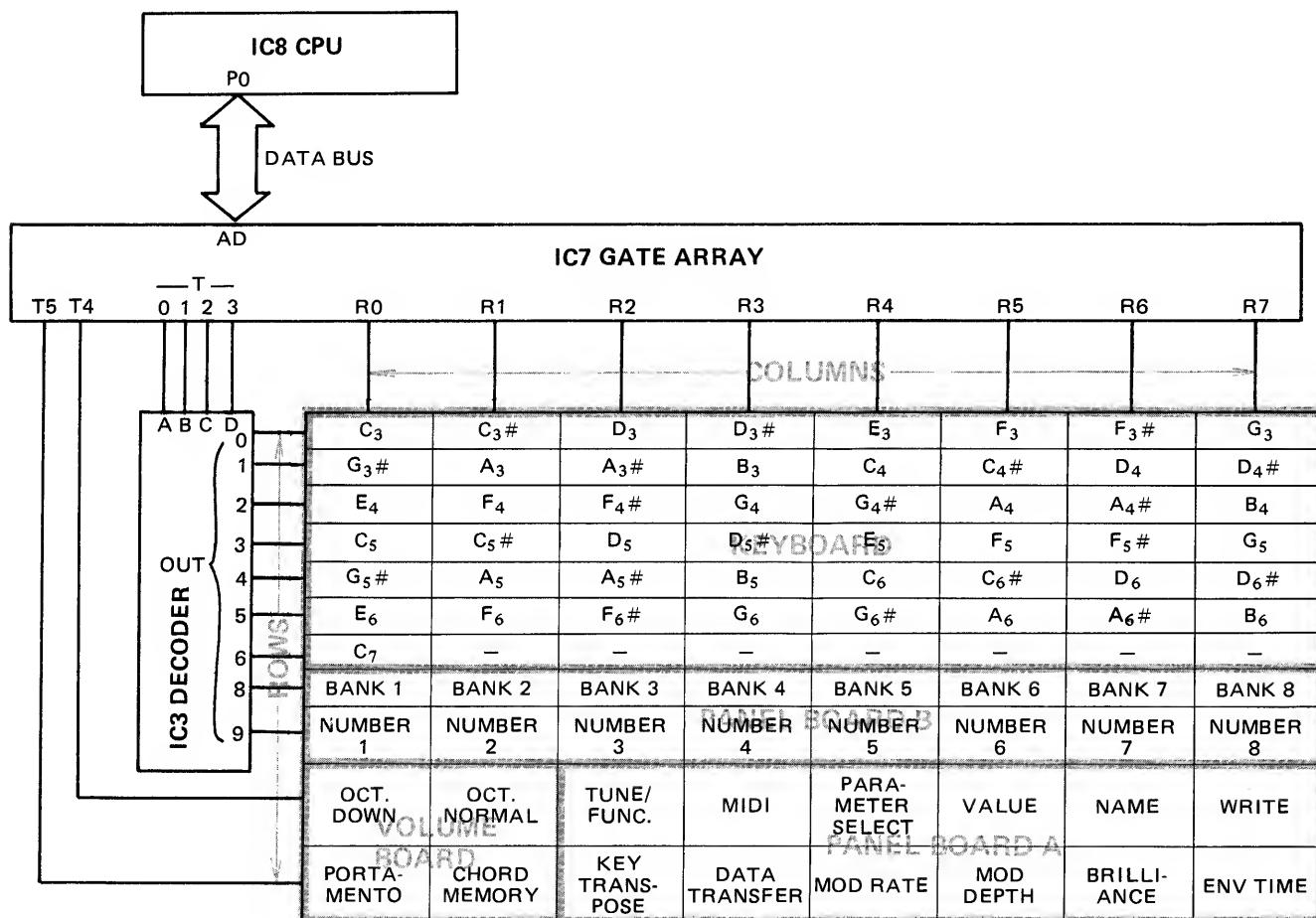
<Fig. 2 DCO IC16 Block Diagram >

CONTROLS READING

Various function controls (switches, pots, external control jacks, etc.) on the JU-1 are read into the CPU IC8 directly or through gate array IC7 or some appropriate devices (ADC, filter). Most of them are read group by group.

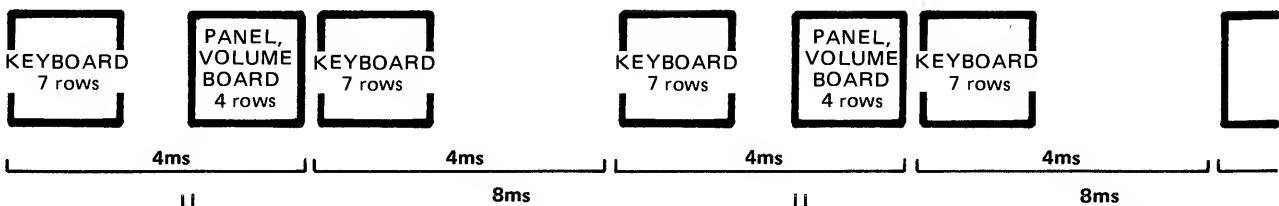
● Keyboard, Panel Board A, Panel Board B (except for SW1 ~ SW3) and Volume Board

These switches — total 81 are connected to gate array IC7 through 8 by 11 matrix. Fig. 3.



<Fig. 3>

Upon receiving switch scanning address on the CPU data bus P0, IC7 places latched data on T0 — T5, of which T0 — T3 are further decoded to have 9 address. The 11 rows are pulled to low one by one while the switches on the low row are read through R0 — R7. IC7 sends the switch status to the CPU through P0. The Fig. 4 below shows the timing of the scanning/reading.



<Fig. 4>

各種コントロールの読み込み

各ファンクション・コントロール（スイッチ、ボリューム、外部ジャック等）は、CPU IC8に読み込まれます。それらは、直接読み込まれるものもあれば、ゲート・アレイ IC7 や専用デバイス（ADC、フィルター）を通して読み込まれるものもあります。

● 鍵盤、パネル・ボードA、パネル・ボードB (SW1 ~ SW3 除く)、ボリューム・ボード

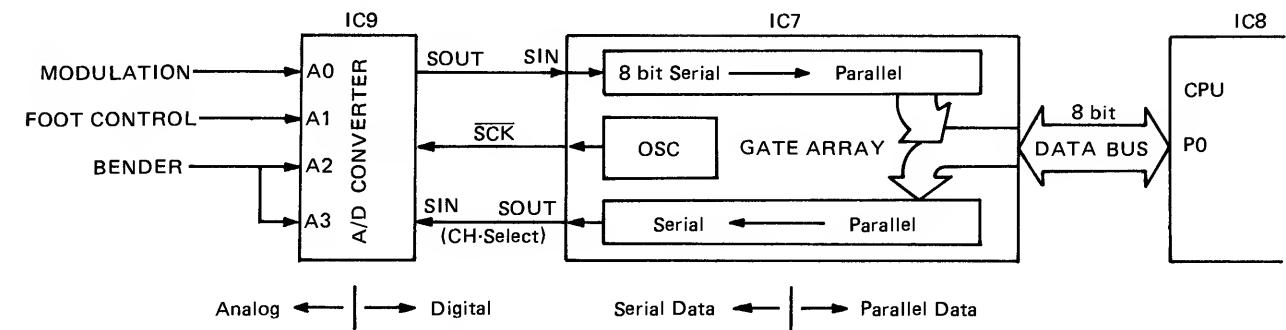
これらの基板には、合計81個のスイッチが図3のように8×11のマトリクス上に並べられていて、ゲート・アレイ IC7に接続されています。

● Bender, Modulation and Foot Control (Jack Board)

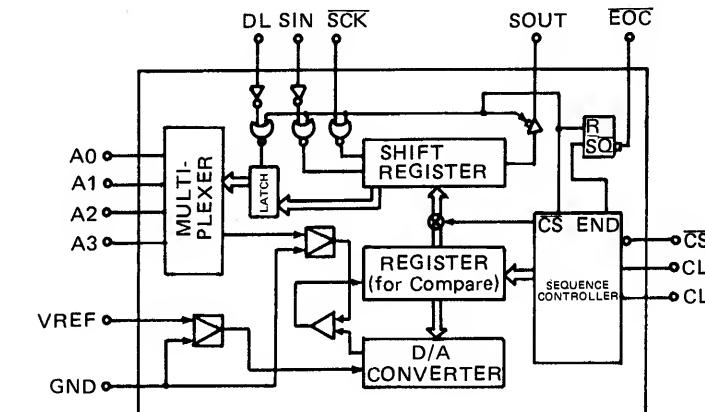
The wiper of these potentiometers are first connected to IC9 which represents each setting in a digital equivalent. IC9 selects among inputs based on a select data coming into its SIN pin, sending a correct one to IC7 in timing with SCK (OUT timing clock.).

● ベンダー、モジュレーション、フット・コントロール (ジャック・ボード)

これらのボリュームは、設定位置に応じたアナログ電圧をA/Dコンバーター IC9に出力します。IC9は、チャンネル・セレクト・データ SIN に応じてこれら3つの入力を選択し、SCKのタイミングでデジタル値に変換した設定値を SOUT より1ビットずつ IC7に出力します。



<Fig. 5>



<Fig. 6>

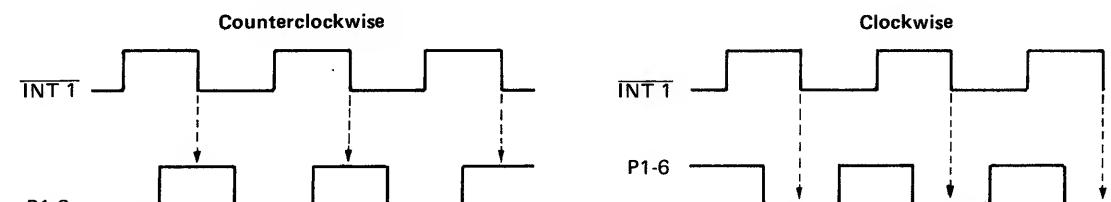
● Rotary Encoder

Rotary Encoder has two outputs whose waveforms are $90 \pm 45^\circ$ out of phase to each other—the phase difference is reversed as the encoder rotates in opposite direction.

The CPU increments a parameter value in proportion to the number of pulses as the encoder rotates CW and decrements as it rotates CCW.

● ロータリー・エンコーダー

ロータリー・エンコーダーのDIRECTIONとTRIG出力の間に、常に $90 \pm 45^\circ$ の位相差があります。これらの出力はそれぞれシュミット・トリガーで波形整形された後、CPU IC8のINT1とP1-6に入ります。CPUはこのトリガーの位相差で回転方向を、またパルスの数によって回転量を判断します。



<Fig. 7>

● PRESET, MEMORY (Panel Board B), Pedal, Foot and Memory Protect (Jack Board)

These switches are read into the CPU directly as shown in Table 4.

NOTE: FVR SW ON = FOOT CONTROL jack plugged.

● プリセット、メモリー (パネル・ボードB)、ペダル、フット、メモリー・プロテクト (ジャック・ボード)

これらのスイッチのオン/オフは表4の様にCPU IC8のP1に直接入ります。なお、FVR SW とはフット・コントロール・ジャックにフット・ボリュームが挿入されているか否かの検出用です。

	Switch Name	ON	OFF
CPU IC8 P1	PRESET GROUP	0	1
	MEMORY GROUP	0	1
	PEDAL SWITCH	0	1
	PEDAL HOLD	0	1
	FVR SW (FOOT CONTROL)	1	0
	MEMORY PROTECT SWITCH	0	1

<Table 4>

LED LIGHTING AND CONTROLS SWITCHING

Switchings of CHORUS, HPF and BENDER POLARITY are made by the control signals from latch IC15. IC15 also latches LED lighting data. IC15 latches these data on an LED supplied from pin 25 of IC7.

LEDの点灯、スイッチ・パラメーターの制御

コーラス、HPF、ベンダー・ポラリティの制御信号はラッチ IC15より出力します。ラッチ IC15は、その他にLEDの点灯データも出力します。

IC15がデータをラッチするタイミングはIC7の25ピンLED端子から送られます。

Latch IC15							
Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7
OCTAVE TRANSPOSE LED	KEY TRANSPOSE LED	PORTA- MENTO LED	CHORD MEMORY LED	CHORUS SWITCH	HPF A SWITCH	HPF B SWITCH	BENDER POLARITY CLOCK

<Table 5>

DMUX AND S/H

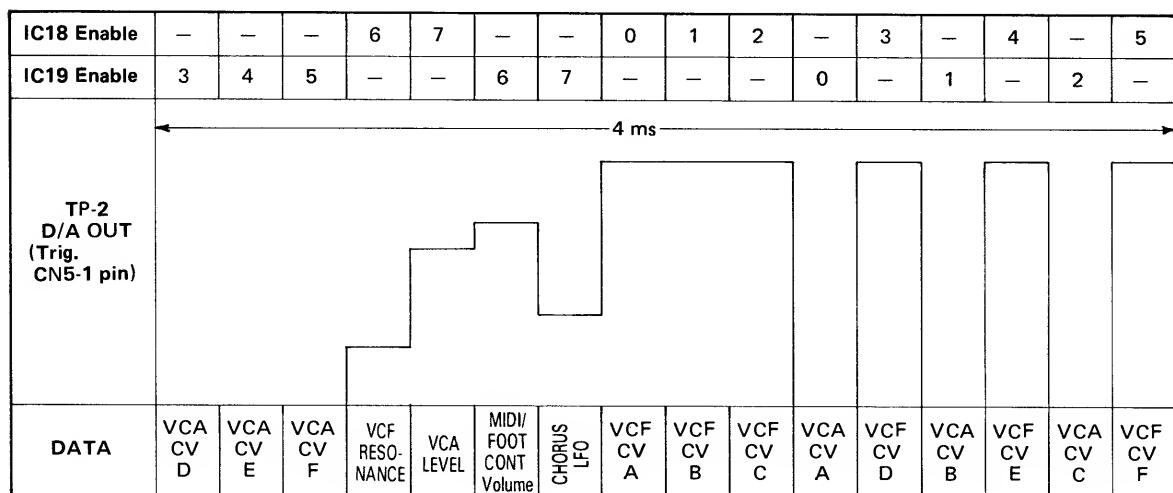
Data for controlling VCF, VCA and subsequent stages are fed from DAC RA3 and IC1 to IC18 AND IC19 in multiplexed analog form as shown below. IC18 and IC19 demultiplex the data and sample each of the signals into the correct destination. Note that IC18 7302 has hold capacitors built internally.

デマルチプレクサー、サンプル・アンド・ホールド

VCF、VCA等を制御するデータは、DAC RA3、IC1から出力され、IC18、IC19に入ります。この間のデータは図8のように時分割多重のアナログ・データです。

IC18、IC19は、このデータを振り分けて次のデータが入ってくるまでホールドします。

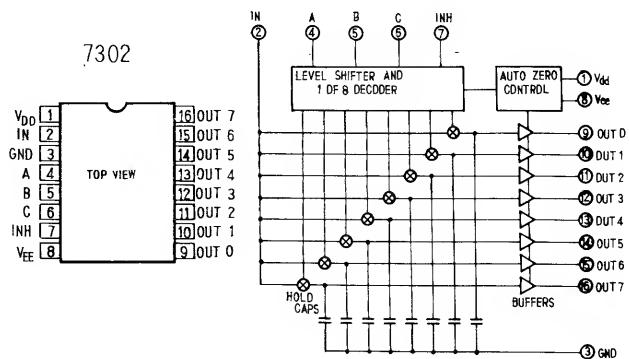
注) IC18 7302は内部にホールド・コンデンサとバッファを持っています。



<Fig. 8>

A	B	C	IC18 OUT	IC19 OUT
0	0	0	0 VCF A CV	0 VCA A CV
0	0	1	1 VCF B CV	1 VCA B CV
0	1	0	2 VCF C CV	2 VCA C CV
0	1	1	3 VCF D CV	3 VCA D CV
1	0	0	4 VCF E CV	4 VCA E CV
1	0	1	5 VCF F CV	5 VCA F CV
1	1	0	6 RESONANCE CV	6 VOLUME CV
1	1	1	7 VCA LEVEL CV	7 CHORUS RATE CV

<Table 6>



<Fig. 9>

VCF, VCA

VCF serves as a 24dB/oct (12dB/oct × 2) state variable filter, which is composed of BPF and LPF. VCA section has both LINEAR control input and EXPONENTIAL control input. The control voltage of VCA CV is applied to LINEAR input and the control voltages of VCA LEVEL and COMPANDING CV are applied to EXPO input.

Each pin of IR3R05 has the function as shown below. The numbers in parentheses correspond to pin numbers.

IN (1) Signal Input.

FREQ (2)

RESO (3) CV Input. These CVs determine timbre and LINE (4) level of a Sound.

EXPO (5)

C1 (13) shows the waveform (Fig. 11) of a signal which passed through BPF.

C2 (12) shows the waveform (Fig. 12) of a signal which passed through LPF.

C3 (11) shows the waveform (Fig. 13) of a signal which passed through LPF + BPF.

C4 (10) shows the waveform (Fig. 14) of a signal which passed through LPF + BPF.

LOAD (6) shows the waveform of a signal which passed from C4 through the buffer.

VCF、VCA

IC17 IR3R05はVCF、VCA用ICです。

VCFの部分は24dB/oct(12dB/oct×2)で減衰するBPFとLPFを組み合わせた可変フィルターです。

VCAの部分はLINEARとEXPONENTIALの2つのコントロール入を持っており、VCA CVはLINEARに、VCA LEVELとCOMPANDING CVはEXPONENTIAL入力になります。

各端子は以下の通りです。

IN (1) シグナル入力

FREQ (2)

RESO (3) コントロール入力

LINE (4)

EXPO (5)

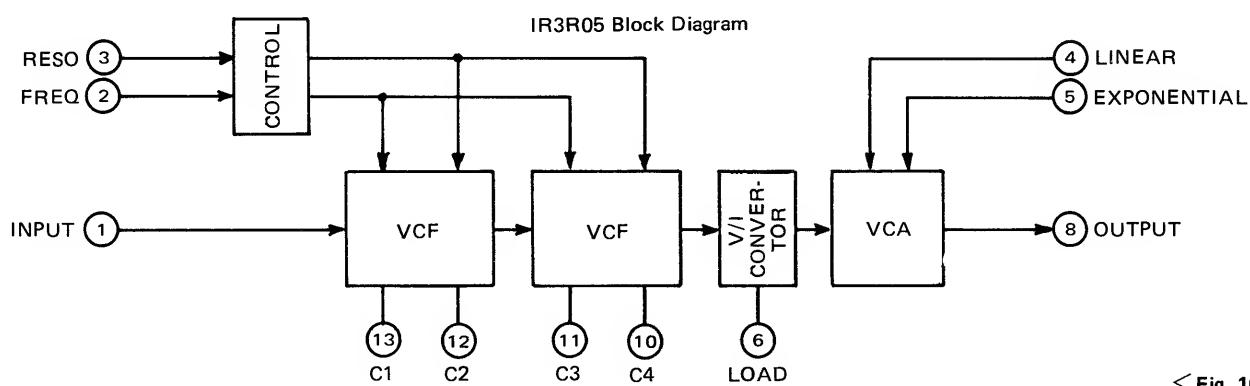
C1 (13) BPFを通った後の信号波形(図11)

C2 (12) LPFを通った後の信号波形(図12)

C3 (11) LPF+BPFを通った後の信号波形(図13)

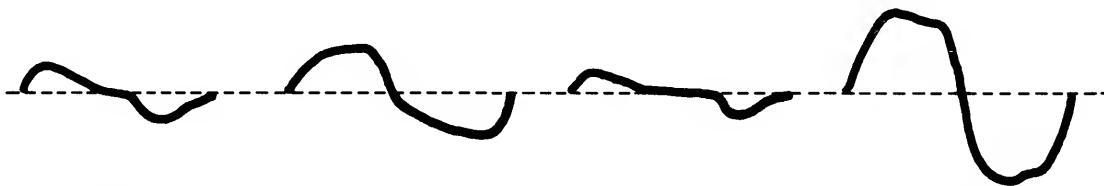
C4 (10) LPF+LPFを通った後の信号波形(図14)

LOAD (6) C4からバッファへ通りぬけた信号波形



<Fig. 10>

INPUT: ~ f = 200Hz SETTING: FREQ MID, RESO MIN



<Fig. 11>

<Fig. 12>

<Fig. 13>

<Fig. 14>

CHECKING AND ADJUSTMENT

In Items 1 thru 4 same steps or statements appear repeatedly — may be confusing; this is because the test program is designed to meet testings intended to 'carry at random'.

Verify the power system before attempting any electrical maintenance.

1. POWER SUPPLY

Check Power Supply board for DC voltages:

VOLTAGE	TOLERANCE
+5V	± 0.2V
+15V	± 0.5V
-15V	± 0.5V

2. LCD

With power OFF

2-1. While holding [OCT DOWN] and [MIDI], turn the power ON.

LCD will indicate either:

[RAM CHECK OK!!] or [RAM wr/rd ERR!!]

Ignore the indication: to be checked later.

2-2. Press [MIDI]; all of the LCD segments should light. Press [MIDI] again; the segments will go off. Verify the bright backlighting EL.

3. INITIALIZATION

With power OFF

BATTERY

3-1. Check the battery voltage at pins 24 (Vdd) and 12 (GND) of IC13 RAM. The reading must be between 2.8 and 3.5V.

RAM READ/WRITE

3-2. While holding down [OCT. DOWN] and [MIDI], switch the power ON.

LCD should display [RAM CHECK OK!!]

If LCD indicates [RAM wr/rd ERR!!], check the RAM.

NOTE:

This step is so programmed that the pre-existing RAM memory is kept intact.

4. RAM INITIALIZATION

4-1. Set MEMORY PROTECT to OFF.

4-2. Turn the power OFF.

4-3. While holding down [PORTAMENTO] and [DATA TRANS], turn the power ON. LCD will display [Initlz Funct ram] and TUNE/FUNCT; MIDI program is transferred into the RAM.

If not "Initialized" i.e. [CHECK BATTERY!!] is displayed, RAM is under either of the following conditions:

Memory has been destroyed due to poor backup.

No RAM initialization has been done.

4-4. Turn the power OFF.

調整・検査仕様

以下1～3項目は相互に関連があるので、順序通りに実行できるとは限らない。エラー表示が出た場合には、適切な処置を行なった後に、再チェックが必要なこともある。

電気的な検査、点検や調整を行なう前には、まず電源関係を点検・確認する。

1. 電源チェック

1a. バッテリー

電源をOFFにし、RAM(IC13:5517)のVDD端子(PIN No.24)と、GND端子(PIN No.12)間電圧を測定する。+2.800～+3.500Vの範囲に入っていることを確認する。

1b. DC電圧

電源スイッチをONにする。

パワーボード上において、
+5V…… +5.0±0.2V
+15V…… +15.0±0.5V
-15V…… -15.0±0.5V

の範囲に入っていることを確認する。

★注★ 「CHECK BATTERY!!!」とLCDに表示された場合

- ①RAMの内容が、RAM自体の不良や電池ぎれ等のため壊れてしまっている。
- ②RAMが一度もイニシャライズされていないか、イニシャライズが出来ない。

ので、3. RAMチェックのイニシャライズの項を実施した後、再点検する。

2. LCDチェック

2-1. 電源を一旦OFFにし、[OCT. DOWN]と[MIDI]を押しながら電源をONにする。この時LCDの表示が、「RAM CHECK OK!!」ならば正常。

「RAM wr/rd ERR!!」ならば異常。

異常の場合は、3項実施した後再チェックする。

2-2. ひき続いて[MIDI]を押すと、押すごとにLCDの全セグメントが点灯・消灯を繰り返せばOK。EL(バックの照明)が点灯していることを確認する。

3. RAMチェック

3a. 書き込み/読み出し

2-1. 項の表示は、RAM(IC13:5517)の読み／書き検査の結果である。この検査の実行でRAM内のデータが、消されたり、書き換えられることはない。

「RAM wr/rd ERR!!」表示時は、RAM IC13を調べる。

3b. イニシャライズ

RAMのイニシャライズには2通りある。いづれの場合もROM(IC10:27128)からRAMにデータが転送される。

(1)TUNE、FUNCとMIDIイニシャライズ。

(2)MEMORY音イニシャライズ。

CAUTION

Step 4-5 erases the previous sound data (factory MEMORY preset or user's program) while making MEMORY sounds identical to those of PRESET. To avoid this from happening, saving RAM data on the tape before initialization is recommended.

4-5. While holding [PORTAMENTO] and [KEY TRANS], turn the power ON' [Copy Prest → Memry] will be shown and the factory PRESET data is entered into the RAM.

TEST MODE

1. Entering Test Mode

1-1. While holding [OCTAVE DOWN] and [TUNE/FUNC], switch the power ON. LCD will display [\$ADJ/INS MODE!!]

In the test mode the following four buttons change function for test purpose. Each initial setting is shown as ON or OFF.

SWITCH (DEFAULT)	LCD	FUNCTION
MOD RATE ON	NO CHANGE	Puts key assignment to ROTARY mode—modules are assigned to the keys in cyclic order form channel 1. If the assignment is disordered due to inadvertent key pressing, simply touch this button for recovery.
MOD DEPTH ON	[\$adj VCF sine]	VCF test setting data is ready for use.
BRILLIANCE OFF	NO CHANGE	HOLD ON or OFF
ENV TIME OFF	[\$adj BASIC wave]	Puts the circuitry into the basic test setting.

BASIC SETTING

Every PARAMETERs and their values can be checked on LCD by pressing [ENV TIME] and [PARAMETER SELECT] then rotating α-DIAL. Shown below are those of basic test parameters; otherwise 00.

CAUTION

When having checked PARAMETERs, be sure to press [MOD DEPTH] to turn BASIC setting OFF before beginning 5. VCF CUTOFF FREQUENCY.

3 b-1. MEMORY PROTECTスイッチを OFF にした後、電源スイッチを OFF にする。

3 b-2. 次に、[PORTAMENTO] と [DATA TRANS] を押さえながら電源を ON にすると、「Initlz Funct ram」と表示されイニシャライズされる。

「CHECK BATTERY!!」と表示された場合、バッテリーか RAM の不良が考えられる。バッテリーが確認済みであれば、RAM 自体の不良とみなせる。

3 b-3. MEMORY音がこわれている場合は、音色データーの入ったテープからロードするか、(2)のイニシャライズ(電源スイッチを一括OFFにし、[PORTAMENTO] と [KEY TRANS] を押さえながら電源を ON にすると「Copy prest → Memry」と表示されイニシャライズされる。)を行なう。

★注★ (2)MEMORY音イニシャライズを実行すると、本来MEMORY音(パンク)を格納すべきRAMにPRESET音がコピーされるので、

- ①PRESETとMEMORYの音色が同じものになる。
- ②ユーザー書き込みのデーターが失われる所以、RAMを交換したり、バッテリーが切れているなどでMEMORY音がない時以外は行なう必要はない。
- イニシャライズし終わったら、MEMORY PROTECTスイッチを ON にする。

4. 治具モードの設定方法

治具モードは、[OCTAVE DOWN] と [TUNE/FUNC]を押しながら電源を入れる。この時、キーアサインは常にロータリーモードとなり、LCD「\$ADJ/INS MODE !!」と表示される。また、同時にVCFの調整用音色データーがCPUに読み込まれる。

治具モード時、以下の4つの機能がTONE MODIFYの機能に取って変わって設定される。尚、②と④の両方共ONにすることはできない。

[スイッチ名] 治具モード投入 時のON/OFF	「LCDの表示」 機能の内容
①[MOD RATE] ON	「LCDの表示は変わらない。」 誤って2音以上鍵盤を押さえてしまうと、キー・アサインされる順序が変わってしまう(例: 1→2→4→5→6→3)ので、それを元の通りに1から6になるように戻す。
②[MOD DEPTH] ON	「\$adj VCF sine」 VCF調整用音色データーセット。
③[BRILLIANCE] OFF	「LCDの表示は、変わらない。」 HOLD ON/OFF(トグル動作)
④[ENV TIME] OFF	「\$adj BASIC wave」 基本セッティングに入る。

NOTE:

Pressing any key on the keyboard will replace parameter value (rightmost figure) with the module number being assigned to the key. Rotating α -DIAL will replace the module number with a new parameter.

PARAMETER	VALUE	PARAMETER	VALUE
DCO RNG	8'	DCO ENV	1
DCO BEND	12	PULSE	01
PW/PWM	80	PWM RATE	80
HPF FREQ	01	VCF FREQ	127
VCF ENV	1	VCF KYBD	14
VCA LEVEL	127	VCA ENV	1
CHORUS	OFF	CRS RATE	64
LFO RATE	80	ENV L1	127
ENV L2	127	ENV L3	127
ENV T4	10		

5. VCF CUTOFF FREQUENCY

Allow at least 10 minutes for warm up.

5-1. Enter TEST MODE.

- 5-2. Connect oscilloscope (0.5V/div, 1ms/div) to TP3 (MIX OUT) of Main Board. Ground scope to TP1 Main Board. Monitoring should be used.
- 5-3. Hold 2nd low C key (C4); it should be assigned Module 1.
- 5-4. Adjust VR1A on the module for the maximum amplitude – 0.8–1.5V.
- 5-5. Repeat steps 5-3 and 5-4 for the reminder.
- 5-6. Play C6 key for each module and check for unchanged amplitude.

尚、[PARAMETER SELECT] を押し、 α -DIAL を左右に回せば PARAMETER の VALUE を見ることができる。基本セッティングの PARAMETER の VALUE は、以下の通りである。ここで示していない VALUE は、全て 0 である。

★注★ パラメーターの内容を見ている途中で、鍵盤を押すと VALUE の右端数字がそのキーにアサインされたモジュール・ナンバーに変わる。尚、この場合 α -DIAL を回し VALUE を設定しなおすと再び新しい VALUE が表示される。

PARAMETER	VALUE	PARAMETER	VALUE
DCO RNG	8'	DCO ENV	1
DCO BEND	12	PULSE	01
PW/PWM	80	PWM RATE	80
HPF FREQ	01	VCF FREQ	127
VCF ENV	1	VCF KYBD	14
VCA LEVEL	127	VCA ENV	1
CHORUS	OFF	CRS RATE	64
LFO RATE	80	ENV L1	127
ENV L2	127	ENV L3	127
ENV T4	10		

5. VCFカットオフ・フリケンシー調整

★注★ この調整は、必ず電源を入れてから少なくとも10分間たってから行なうこと！
治具モードに入り、VCF 調整用音色データーセットをする ([MOD DEPTH]を押す)。オシロスコープ (0.5V/DIV, 1 ms/DIV にセットしておく) をメインボード上の TP3 (MIX OUT) に接続する。以後

6. DCO

6-1. Press [ENV TIME]; [\$adj BASIC WAVE] will be displayed and the basic patches are set.

In the following table action must be carried out from left column to the right, then the left column of the next column.

PARAMETER names and associated value can be changed by rotating α -DIAL.

When a key is played, the rightmost figure of a parameter value is replaced by the Module number, which in turn replaced by a new value as the α -DIAL is rotated.

6-2. Verify the equal waveform and level by pressing C4 key 6 times.

6-3. Press [PARAMETER SELECT]; [DCO RNG=8'] will be displayed.

6-4. Press [VALUE]; hold C4 key; rotate α -DIAL to display [DCO RNG 32' → 16' → 8' → 4'] and verify one octave changes of the pitch.

モニタースピーカーも接続して、音を聞きながら調整する。(GND は、メインボード上のTP1に接続する) C4key (左から 2 番目の Ckey) を押さえることにモジュールが 1 ~ 6 に変わるので、各モジュールごとにサイン波が最大になるよう VCF FREQ. (VR1A~F) を調整する。この時、0.8~1.5V の範囲に入っていればOK。次に、半固定抵抗をさわらないで、C6 key を 6 回押さえ、全てのモジュールで電圧が下がっていないことを確認すれば OK。

6. DCO チェック

TONE MODIFY の [ENV TIME] を押すと、「\$adj BASIC WAVE」と表示され、基本セッティングに入る。
オシロスコープを OUTPUT ジャックに接続する。

★注★ 治具モード時、鍵盤を押すと LCD の右端にモジュール・ナンバーが表示される。そのため、その時のPARAMETER の値が、見れなくなることがあるので注意すること。尚、 α -DIALを回すと新しいPARAMETER の値が表示される。

C4key を 6 回押させて、モジュールごとの出力波形、レベルが同じであることを確認する。

[PARAMETER SELECT] を押すと、「DCO RNG=8」と表示される。[VALUE] を押し、C4keyを押さえながら、 α -DIALを左右に回し、DCO RNG を「32' → 16' → 8' → 4」を変え、それに合わせて音程が変わることを確認する。

以下同様にして確認する。

6-5. Similarly, check the items in the table below.

α -DIAL	LCD	Press	Check
left right left right	DCO RNG = 8' → 8' PULSE = 01 PULSE = 01 → 00 SAWTOOTH = 00	PARAMETER SELECT VALUE PARAMETER SELECT VALUE	no sound heard no sound heard
right right right right right	SAWTOOTH = 00 → 01 SAWTOOTH = 00 → 02 SAWTOOTH = 00 → 03 SAWTOOTH = 00 → 04 SAWTOOTH = 00 → 05	C4 key 6 times C4 key 6 times C4 key 6 times C4 key 6 times C4 key 6 times	waveforms equal the previous one in shape and amplitude
left	SAWTOOTH = 00 → 00	PARAMETER SELECT	no sound

6-6. Reset scope to 2ms/div.

right	SUB LEVEL = 00	VALUE	no sound
right right right	SUB LEVL = 00 → 01 SUB LEVL = 00 → 02 SUB LEVL = 00 → 03	C4 key 6 times C4 key 6 times C4 key 6 times PARAMETER SELECT	Leveles increase as VALUE is increased while no difference among modules
left	SUB = 00	VALUE	no sound
right right right right right	SUB = 00 → 01 SUB = 00 → 02 SUB = 00 → 03 SUB = 00 → 04 SUB = 00 → 05	C4 key 6 times C4 key 6 times C4 key 6 times C4 key 6 times C4 key 6 times	Waveform chages as the VALUE changes while no change is noted among modules

6-7. Reset scope to 1ms/div.

left left right	SUB LEVL = 03 SUB LEVL = 03 → 00 NOISE LVL = 00	PARAMETER SELECT VALUE PARAMETER SELECT VALUE	no sound no sound
right	NOISE LVL = 00 → 03	C4 key 6 times	no level difference among modules
left left	NOISE LVL = 03 → 00 PULSE = 00	PARAMETER SELECT VALUE	no sound no sound
right	PULSE = 00 → 03	C4 key 6 times	All modules are Pulse Width Modulated

α -DIAL	LCD表示	押さえるSW	確認事項
左 右 左 右	DCO RNG = 8' → 8' PULSE = 01 PULSE = 01 → 00 SAWTOOTH = 00	PARAMETER SELECT VALUE PARAMETER SELECT VALUE	音は出なくなる。 音は出ない。
右 右 右 右 右	SAWTOOTH = 00 → 01 SAWTOOTH = 00 → 02 SAWTOOTH = 00 → 03 SAWTOOTH = 00 → 04 SAWTOOTH = 00 → 05	C4key 6回 C4key 6回 C4key 6回 C4key 6回 C4key 6回	モジュールごとの波形とレベルが同じである。
左	SAWTOOTH = 00 → 00	PARAMETER SELECT	音は出ない。

ここでオシロスコープのセッティングを1ms/DIVから2ms/DIVに変える。

右	SUB LEVL = 00	VALUE	音は出ない。
右 右 右 右	SUB LEVL = 00 → 01 SUB LEVL = 00 → 02 SUB LEVL = 00 → 03 NOISE LVL = 00 → 03	C4Key 6回 C4key 6回 C4key 6回 PARAMETER SELECT	モジュールごとの出力波形中点レベルが同じである。 表示されたレベルと共に、レベルが大きくなる。
左	SUB = 00	VALUE	音は出ない。
右 右 右 右 右	SUB = 00 → 01 SUB = 00 → 02 SUB = 00 → 03 SUB = 00 → 04 SUB = 00 → 05	C4key 6回 C4key 6回 C4key 6回 C4key 6回 C4key 6回	モジュールごとの出力波形レベルが同じである。 表示された数字と共に、波形が変わる。

ここでオシロスコープのセッティングを元の1ms/DIVに戻す。

左 左 右	SUB LEVL = 03 SUB LEVL = 03 → 00 NOISE LVL = 00	PARAMETER SELECT VALUE PARAMETER SELECT VALUE	音は出なくなる。 音は出ない。
右	NOISE LVL = 00 → 03	C4key 6回	モジュールごとのレベルが同じである。
左 左 右	NOISE LVL = 03 → 00 PULSE = 00	PARAMETER SELECT VALUE	音は出なくなる。 音は出ない。
右	PULSE = 00 → 03	C4key 6回	全モジュールにPWMがかかっている。

(ENV TIME) を押し、基本セッティングにする。A4keyを押さえながら、(TUNE) を押し、 α -DIAL を左右に回しピッチが変わることを確認する。同時に、LCD に表示された周波数

(両側に三角印が点灯していること)と、TUNNER の周波数がほぼ一致することを確認する。

6-8. Press [ENV TIME] (basic setting).
 6-9. Press [TUNE/FUNC], Hold 2nd low A key (A4), rotate α -DIAL; verify the pitch change. Also check LCD frequency reading and its accuracy.
 Arrow heads must appear on both sides of the reading.

7. HPF

7-1. Press [ENV TIME] for basic setting.
 7-2. Press [PARAMETER SELECT] and select [HPF FREQ=01] by rotating α -DIAL. Press [VALUE].
 7-3. While holding down C4 key, rotate α -DIAL right or left to show [00 → 01 → 02 → 03]; the waveform should change as shown below.

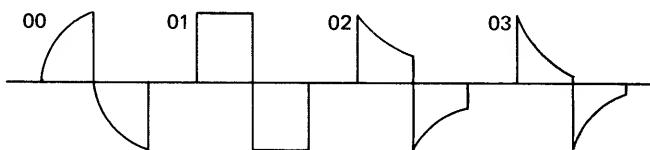


Fig. 1

8. OUTPUT LEVEL

8-1. Plug voltmeter (or scope) to both OUTPUT jacks.
 8-2. Press [ENV TIME] (basic setting).
 8-3. Raise VOLUME to the maximum.
 8-4. Press C4 key. The level difference between both channels must be within 0.1V with the reading ranging 0.8–1.5V p-p.

7. HPF チェック

[ENV TIME] を押し、基本セッティングにする。[PARAMETER SELECT] を押し、 α -DIALを右に回し、「HPF FREQ = 01」と表示したところで [VALUE] を押す。C4keyを押さえながら、 α -DIALを左右に回し、「00→01→02→03」と変えて、波形の変わること(図1参照)を確認する。

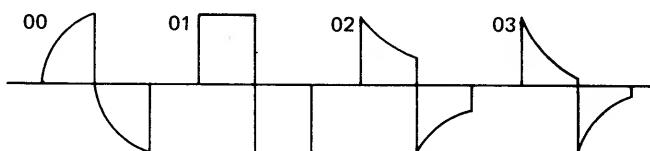


図 1

8. OUTPUT レベル チェック

左右両方の OUTPUT ジャックにプラグを差す。
 [ENV TIME] を押し、基本セッティングにする。VOLUME を最大にし、C4keyを押さえ OUTPUT レベルを測定する。左右両方のレベルが0.8~1.5V の範囲内であり、左右のレベル差が、0.1V 以内であることを確認する。

9. CHORUS チェック

[ENV TIME] を押し、基本セッティングにする。[PARAMETER SELECT] を押し、 α -DIALを右に回し、「CHORUS = OFF」と表示したところで [VALUE] を押す。C4keyを押さえながら α -DIALを右に回し、「OFF→ON」になると波形の山が動くこと(図2参照)を確認する。

9. CHORUS

9-1. Press [ENV TIME] (basic setting). Press [PARAMETER SELECT].
 9-2. Select [CHORUS = OFF] with α -DIAL and press VALUE.
 9-3. While pressing C4 key, turn ON and OFF CHORUS with the α -DIAL. At the same time observe the scope for the waveform change as shown below.

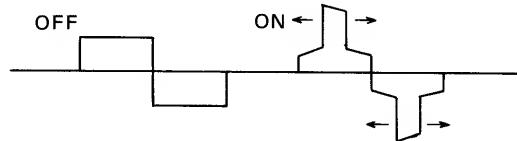


Fig. 2

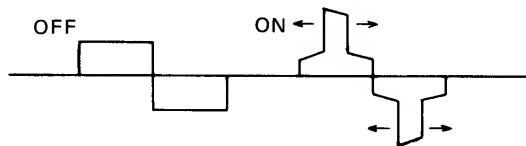
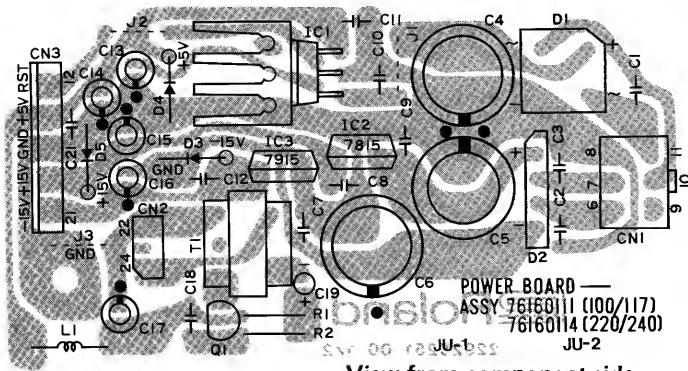


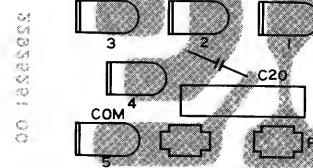
図 2

12 03 04 05 06 07 08 09 00 01 02 03 04 05 06 07 08 09 00

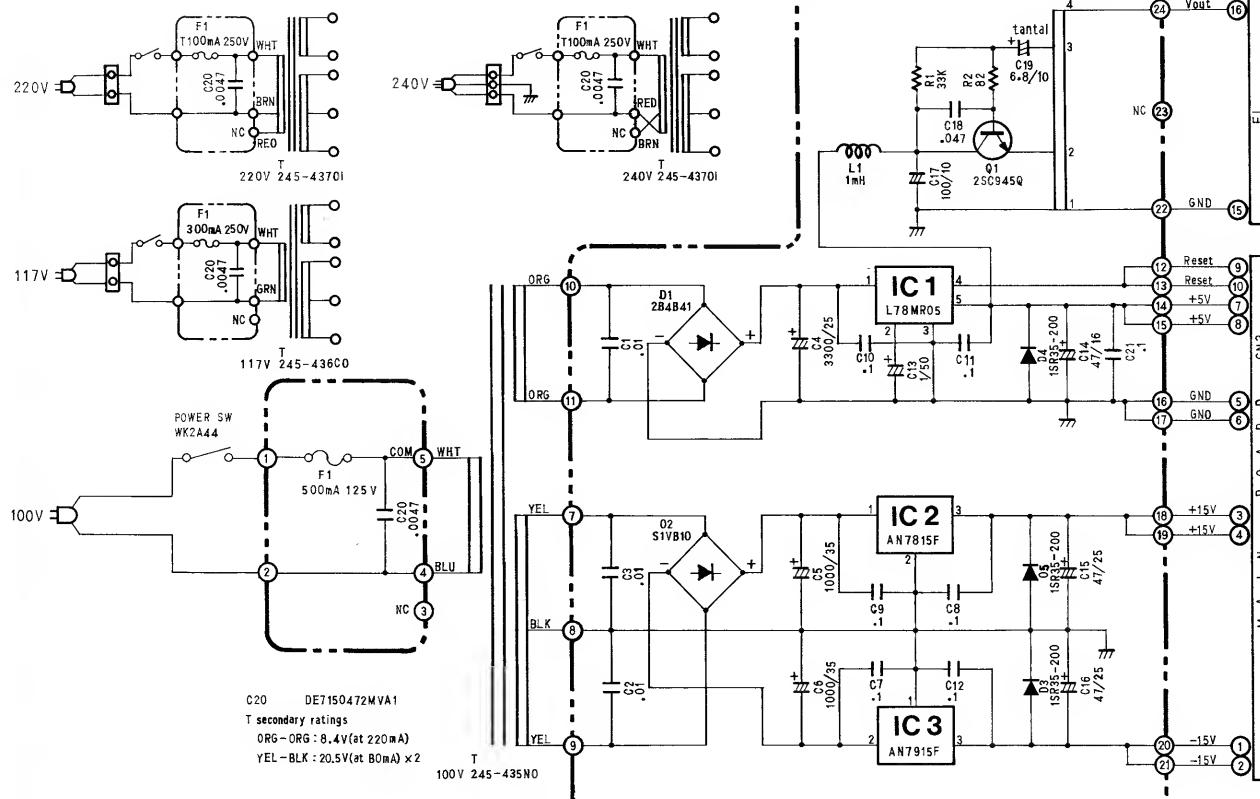
POWER SUPPLY BOARD
7616011100 {100V}
7616011200 {117V}
7616011400 {220/240V}



View from component side.



View from component side.

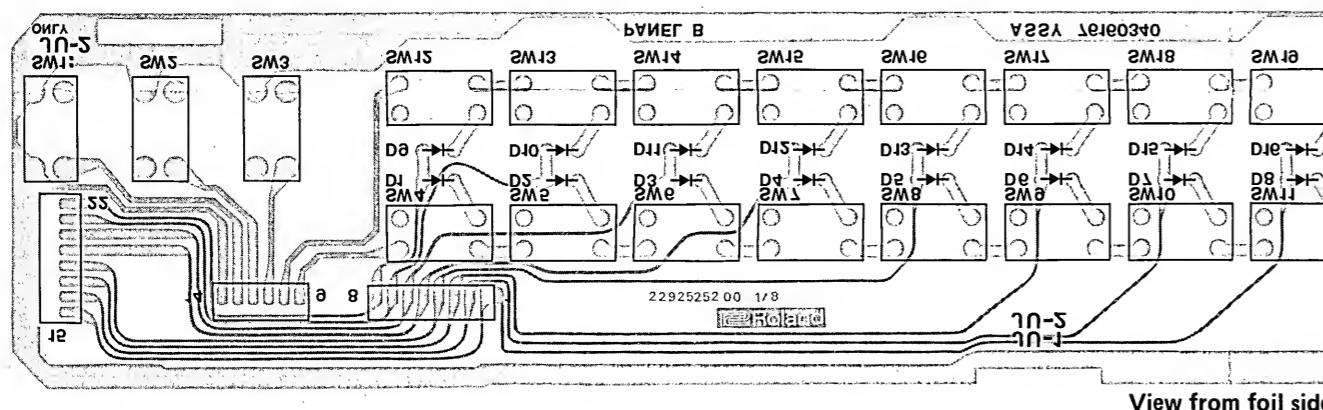


JU-1 POWER SUPPLY BOARD

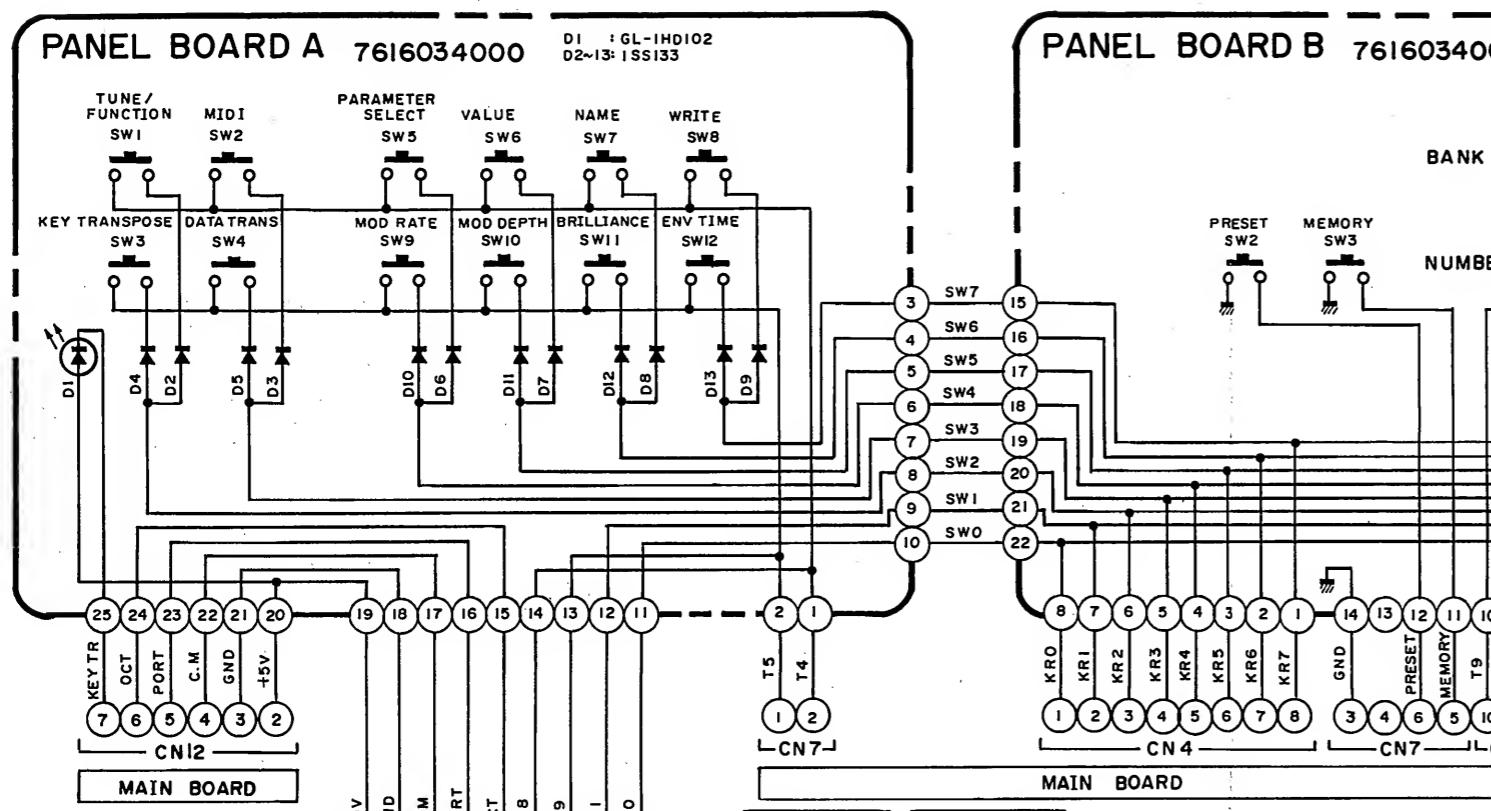
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y

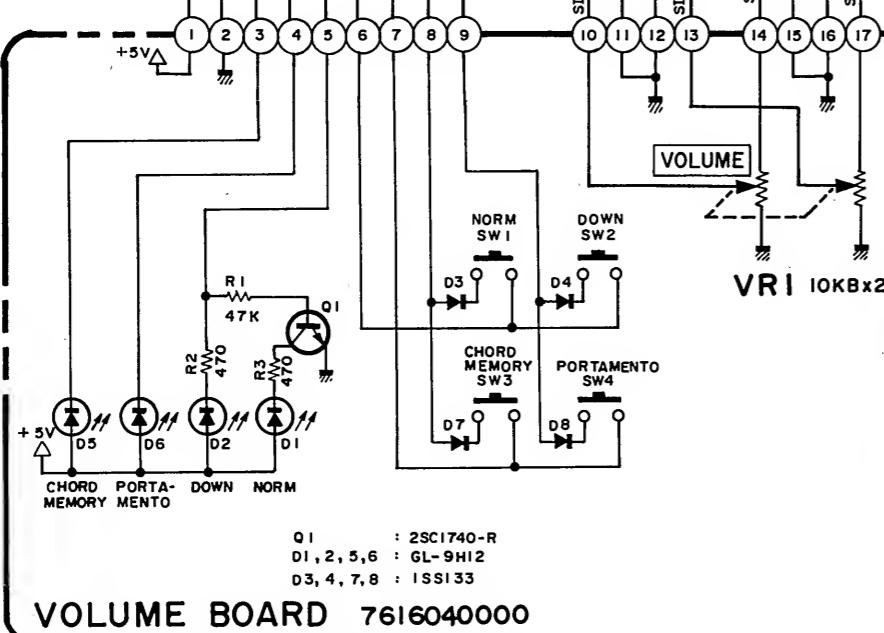
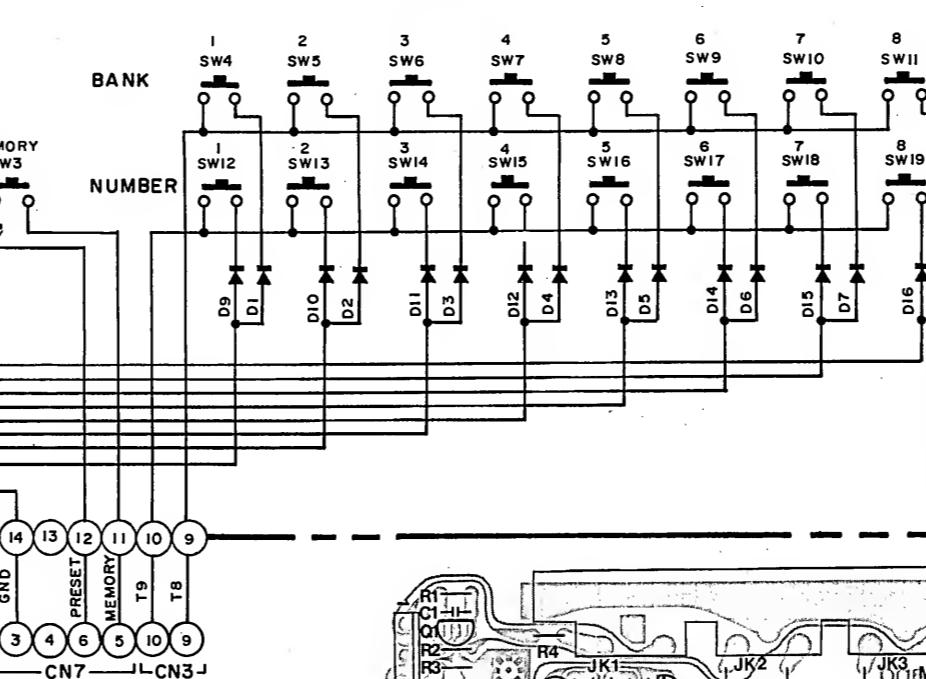
PANEL BOARD A.B 7616034000



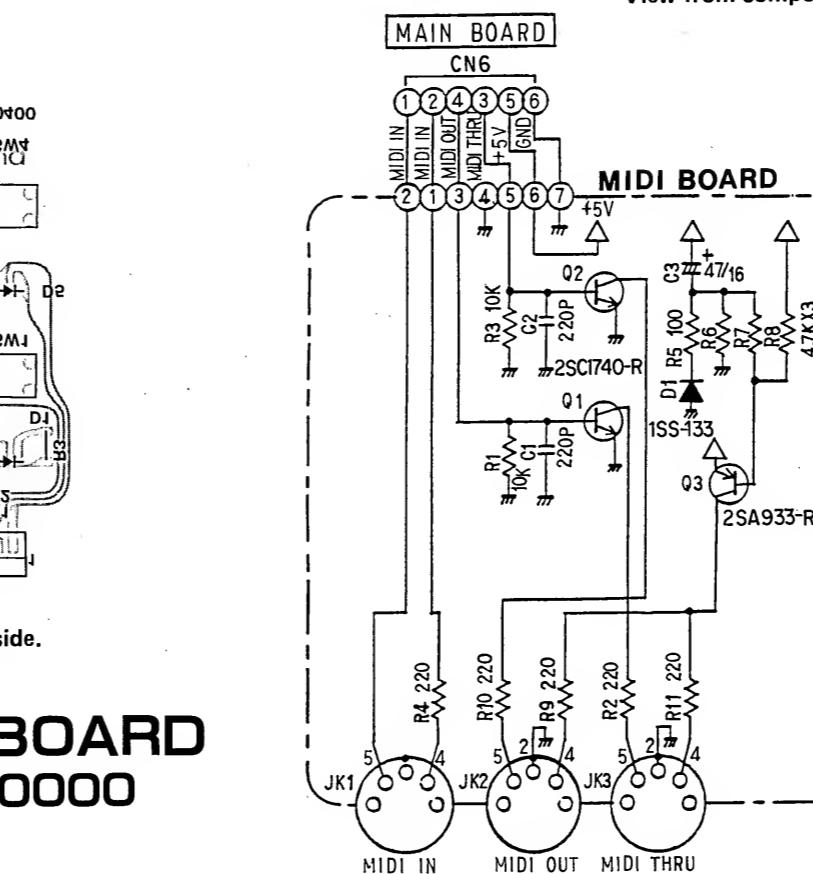
PANEL BOARD A 7616034000



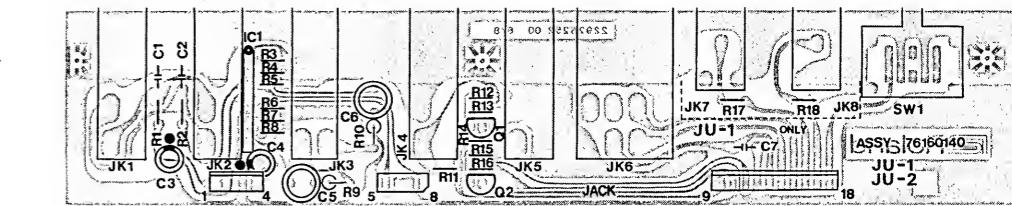
PANEL BOARD B 7616034000



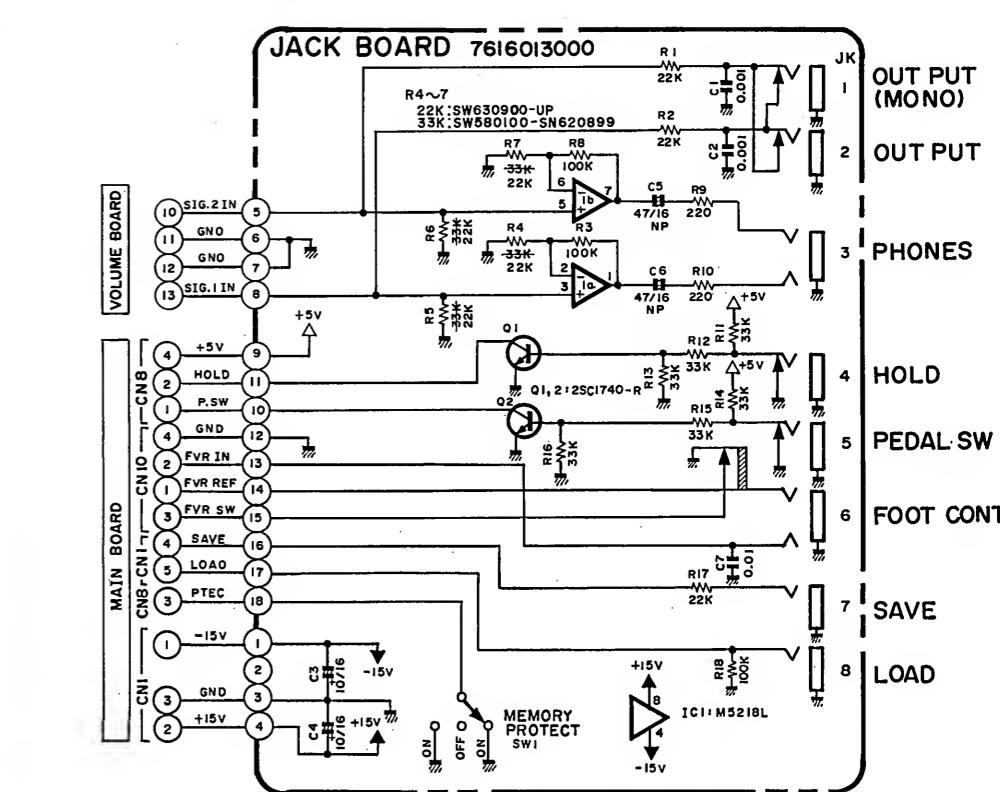
VOLUME BOARD 7616040000



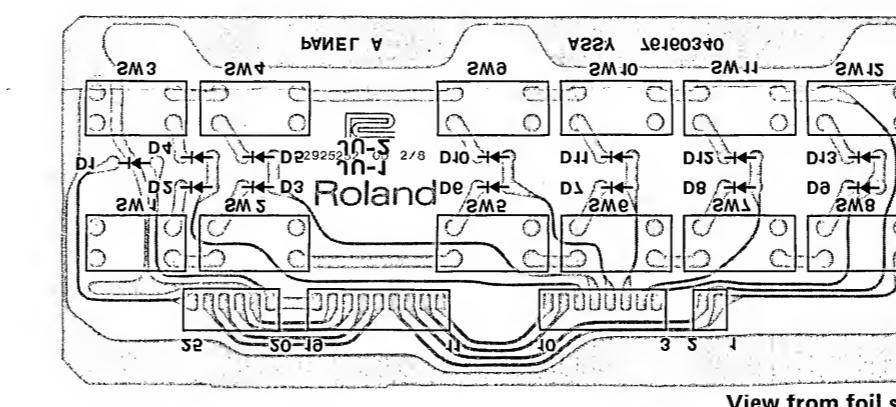
MIDI BOARD 7616013000



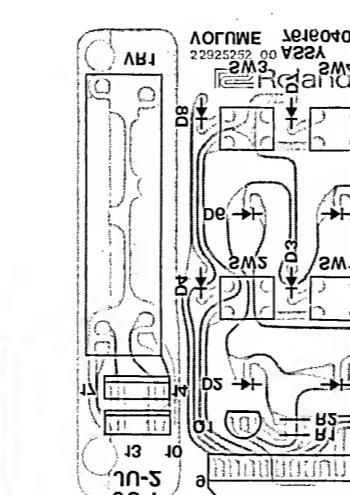
JACK BOARD 7616013000



View from component side.



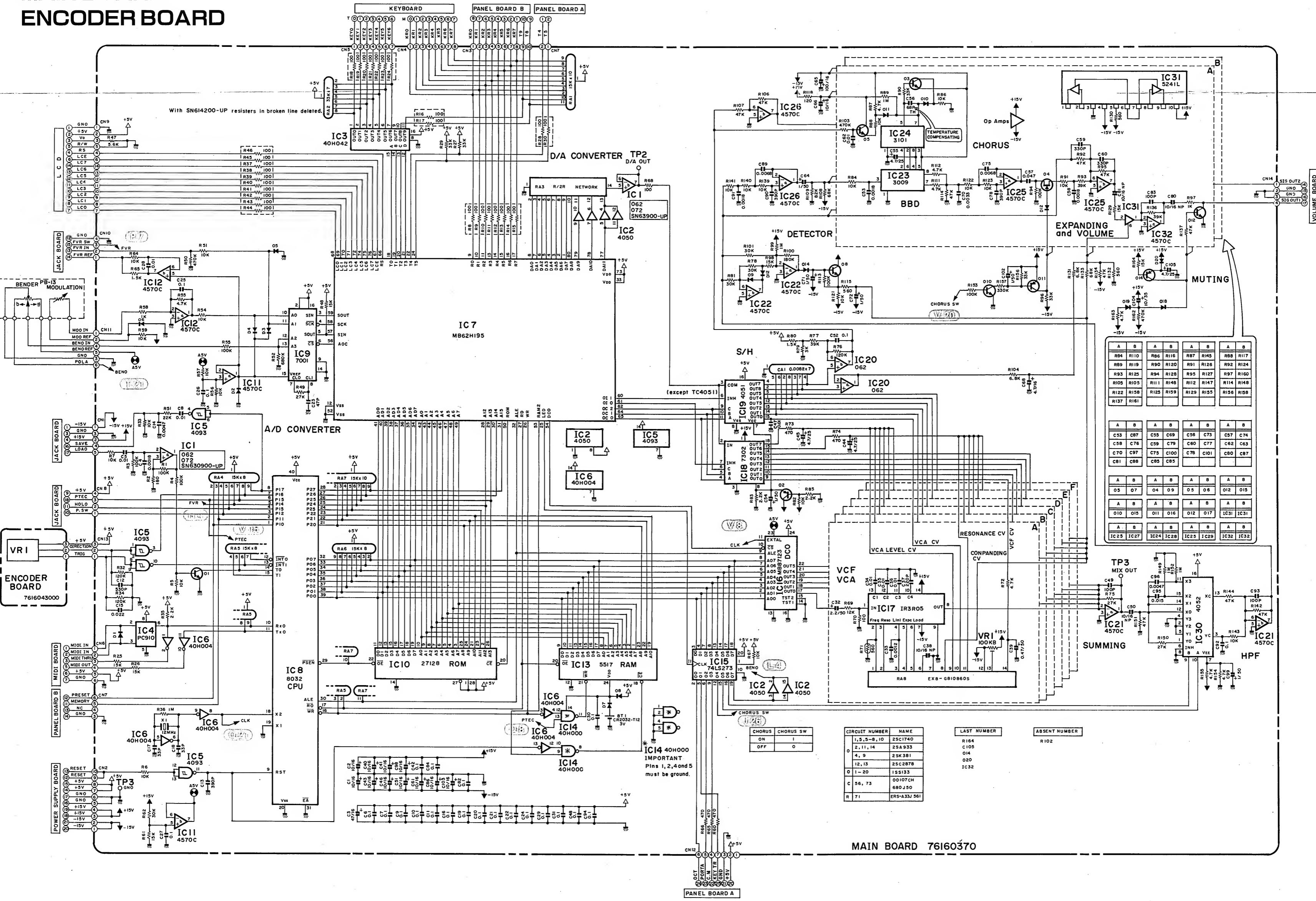
View from foil side.



View from foil side.

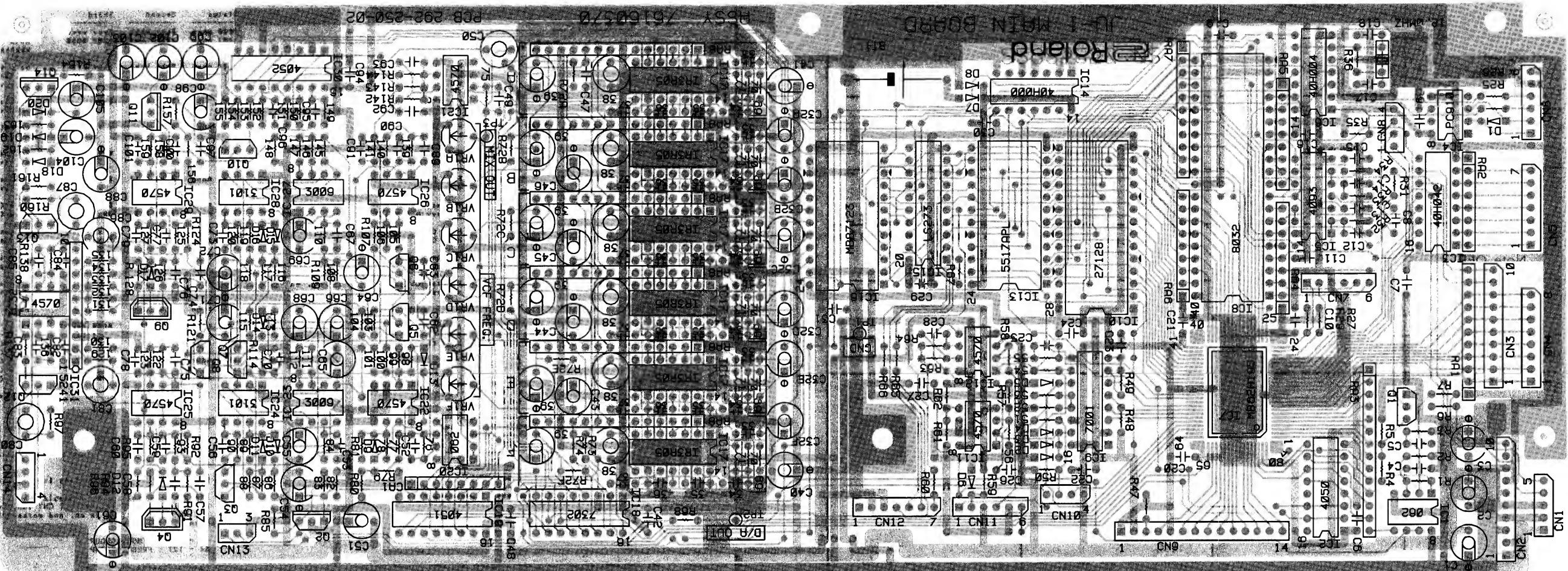
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |

MAIN BOARD ENCODER BOARD

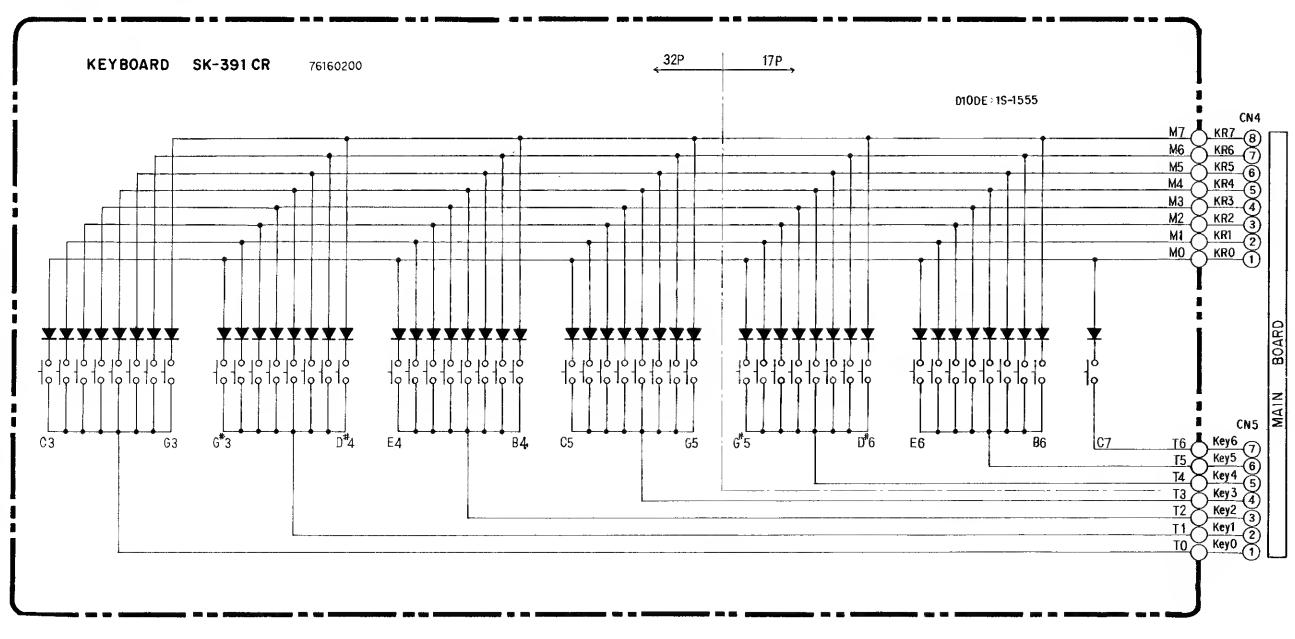


1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |

MAIN BOARD 76160370



KEYBOARD



ENCODER BOARD 7616043000

ROM REVISION

Ver. 1.5 (2.5U)

ROMs of this version incorporate the updated that implements the following:

Increase the resolution of a transmitted MIDI data "Pitch Bender Change"; from 9 bits to 14 bits.

Correct LCD misdisplay taking "successive TUNE/FUNC. or MIDI writing" against MEMORY PROTECT.

Change MIDI exclusive receiving routine to relieve one JU-1 from: being its certain functions, expect keyboard play, disturbed by a received exclusive message including TONE NAME sent from the other JU-1.

Eliminate Discrepancy Between Parameter Value and LCD Indication in TONE MODIFY Mode

If α -DIAL is overturned past an "extreme" on the display in TONE MODIFY mode, a parameter follows the rotation up to several turns, incrementing or decrementing its value.

Returning the dial, however, does not allow the display to keep the "extreme" indication waiting for the parameter value to match.

i.e. the indication shifts toward the center, leaving the discrepancy between the extreme and the over-value.

Ver. 1.5 defeats the α -DIAL output exceeding an extreme.

6-voice polyphonic synthesizer

MODEL JU-1 MIDI Implementation Chart

Function.....	Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1 - 16 1 - 16	1 - 16 1 - 16
Mode	Default Messages Altered	Mode 3 POLY, OMNI OFF *****	Mode 1, 3 MONO, POLY, OMNI ON/OFF MONO(m ≠ 1) → Mode 1, 3
Note Number	True voice	12 - 108 *****	0 - 127 12 - 108
Velocity	Note ON Note OFF	*	○ v = 1-127 X 9n v = 0
After Touch	Key's Ch's	X X	X *
Pitch Bender	*	* 0 - 12 semi	9 bit resolution
Control Change	1 4 5 7 64 65	*	Modulation Foot Control Portamento Time Volume Hold Portamento Switch
Prog Change	True #	* 0-127 *****	* 0 - 127 0 - 127
System Exclusive	*	*	
System Common	Song Pos Song Sel Tune	X X X	X X X
System Real Time	Clock Commands	X X	X X
AUX Mes-sages	Local ON/OFF All Notes OFF Active Sense Reset	X ○ (123) X X	○ (123 - 127) ○ X
Notes			* : Can be set to ○ or X manually, and memorized.

Mode 1 : OMNI ON, POLY
Mode 3 : OMNI OFF, POLYMode 2 : OMNI ON, MONO
Mode 4 : OMNI OFF, MONO○ : Yes
X : No

6-voice polyphonic synthesizer

MODEL JU-1 MIDI Implementation

*** JU-1 MIDI IMPLEMENTATION ***				RECOGNIZED RECEIVE DATA			
version 1.1				Description			
Oct. 29 1985				Note OFF, velocity ignored			
1. TRANSMITTED DATA				Note OFF			
Status	Second	Third	Description	1000 nnnn	0kkk kkkk	0vvv vvvv	
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkk = 12 - 108 vvvvvv = 16 - 127 (FOOT CONTROL ON) vvvvvv = 64 (FOOT CONTROL OFF)	*	1001 nnnn	0kkk kkkk	0vvv vvvv
1001 nnnn	0kkk kkkk	0000 0000	Note OFF kkkkkk = 12 - 108	1011 nnnn	0000 0001	0vvv vvvv	
1011 nnnn	0000 0001	0vvv vvvv	Modulation vvvvvv = 0 - 127	1011 nnnn	0000 0100	0vvv vvvv	
1011 nnnn	0000 0100	0vvv vvvv	Foot Control vvvvvv = 0 - 127	1011 nnnn	0000 0101	0vvv vvvv	
1011 nnnn	0000 0111	0vvv vvvv	Volume vvvvvv = 0 - 127	1011 nnnn	0100 0000	01xx xxxx	
1011 nnnn	0100 0000	0111 1111	Hold ON Hold OFF	1011 nnnn	0100 0001	01xx xxxx	
1011 nnnn	0100 0001	0111 1111	Portamento ON Portamento OFF	1100 nnnn	0ppp pppp		
1011 nnnn	0100 0001	0000 0000	Program Change pppppp = 0 - 127	1101 nnnn	0vvv vvvv		
1100 nnnn	0ppp pppp		Pitch Bender Change	1110 nnnn	0bbx xxxx	0bbb bbbb	
1011 nnnn	0111 1010	0000 0000	All Notes OFF	1011 nnnn	0111 1010	0000 0000	
1011 nnnn	0111 1100	0000 0000	OMNI OFF	1011 nnnn	0111 1100	0000 0000	
1011 nnnn	0111 1111	0000 0000	POLY ON	1011 nnnn	0111 1111	0000 0000	
				1111 1110		Active Sensing	
Notes :				Notes :			
*1 The data to be transmitted (0vvvvvvv) in each FOOT CNT function is determined by the position of Foot Control volume as shown in the table below.				*1 Note numbers outside the range 12 - 108 are transposed to the nearest octave inside this range.			
*2 Received if the corresponding function switch is ON.				While 'CHORD MEMORY' is on, modified notes with CHORD MEMORY are sounded.			
*3 The Foot Control can be recognized specifically when AFTER is selected in the FOOT CNT function and AFTER in the MIDI function is on, and works just like the Channel After Touch.				*2 Received if the corresponding function switch is ON.			
*4 0 - 63 : MEMORY GROUP 64 - 127 : PRESET GROUP				*3 The Foot Control can be recognized specifically when AFTER is selected in the FOOT CNT function and AFTER in the MIDI function is on, and works just like the Channel After Touch.			
*5 Ignored during any key on.				*4 0 - 63 : MEMORY GROUP 64 - 127 : PRESET GROUP			
*6 Mod Messages (123 - 127) are also recognized as ALL NOTES OFF.				*5 Ignored during any key on.			
Mode Messages are recognized as follows:				*6 Mod Messages (123 - 127) are also recognized as ALL NOTES OFF.			
POLY ON (127) MONO ON (126) MONO ON (126)				Mode Messages are recognized as follows:			
mm 1 mmmm < 1 mmmm > 1				POLY ON (127) MONO ON (126) MONO ON (126)			
OMNI OFF (124) OMNI = OFF OMNI = OFF OMNI = OFF				mm 1 mmmm < 1 mmmm > 1			
POLY MONO ** MONO ** POLY				OMNI OFF (124) OMNI = ON OMNI = ON OMNI = ON			
OMNI ON (125) OMNI = ON OMNI = ON OMNI = ON				POLY MONO ** MONO ** POLY			
** 'CHORD MEMORY' on				** 'CHORD MEMORY' on			
3. TRANSMITTED EXCLUSIVE MESSAGES				3. TRANSMITTED EXCLUSIVE MESSAGES			
*Transmitted if EXCL in the MIDI function is on.				*Transmitted if EXCL in the MIDI function is on.			
3.1 All Tone Parameters with Tone names (APR)				3.1 All Tone Parameters with Tone names (APR)			
When the Group, Bank or Number is changed.				When the Group, Bank or Number is changed.			
Byte				Byte			
a 1111 0000	b 0100 0001	c 0011 0101	d 0000 nnnn	e 0010 0011	f 0010 0000	g 0000 0001	
Exclusive status	Roland ID	Operation code = APR (all parameters)	Unit # = MIDI basic channel, nnnn = 0 - 15	Format type (JU-1, JU-2)	Level # = 1	Group #	
b 0100 0001	c 0011 0101	d 0000 nnnn	where nnnn + 1 = channel #	Value (0 - 127)	In sequence (36 bytes total)	Tone name (0 - 63)	
c 0011 0101	d 0000 nnnn	where nnnn + 1 = channel #	where nnnn + 1 = channel #	: In sequence (10 bytes total)	: In sequence (10 bytes total)	: End of System Exclusive	
d 0000 nnnn				j 1111 0111			
e 0010 0011	f 0010 0000	g 0000 0001					
f 0010 0000	g 0000 0001						
g 0000 0001							
3.2 Individual Tone Parameter (IPR)				3.2 Individual Tone Parameter (IPR)			
When the Parameters are changed.				When the Parameters are changed.			
Byte				Byte			
a 1111 0000	b 0100 0001	c 0011 0101	d 0000 nnnn	e 0010 0011	f 0010 0000	g 0000 0001	
Exclusive status	Roland ID	Operation code = IPR (individual parameter)	Unit # = MIDI basic channel, nnnn = 0 - 15	Format type (JU-1, JU-2)	Level # = 1	Group #	
b 0100 0001	c 0011 0101	d 0000 nnnn	where nnnn + 1 = channel #	Value (0 - 127)	In sequence (36 bytes total)	Tone name (0 - 63)	
c 0011 0101	d 0000 nnnn	where nnnn + 1 = channel #	where nnnn + 1 = channel #	: In sequence (10 bytes total)	: In sequence (10 bytes total)	: End of System Exclusive	
d 0000 nnnn				j 1111 0111			
e 0010 0011	f 0010 0000	g 0000 0001					
f 0010 0000	g 0000 0001						
g 0000 0001							
20				20			

3.3 Bulk Dump (BLD)

Bulk Dump has no relation with the EXCL in the MIDI function.
When the 'DATA TRANSFER Button', 'WRITE Button' and 'BULK DUMP Button' are pressed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0111	Operation code = BLD (bulk dump)
d 0000 nnnn	Unit # = MIDI basic channel. nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (< JU-1, JU-2 >)
f 0010 0000	Level # = 1
g 0000 0001	Group #
h 0000 0000	Extension of program #
i 00pp pppp	Program # (pppp= n*4 : n = 0 - 15)
J 0000 llll	4 sets of TONE data (256 bytes)
:	
k 1111 0111	End of System Exclusive

Notes :

The Program # (1) represents the first TONE number of the TONE data sets (J).
The 4 sets of TONE data are sequentially transmitted.
TONE data is sent in four-bit nibbles, right justified,
least significant nibble sent first.
Each TONE data consists of 32 bytes.
The Bulk Dump message repeats 16 times.

*TONE data format

byte	msb	lsb
0	: DCO AFTER DEPTH	: VCF KEY FOLLOW
1	: VCF AFTER DEPTH	: VCA AFTER DEPTH
2	: ENV KEY FOLLOW	: DCO BENDER RANGE
3	*** : DCO LFO MOD DEPTH	
4	: DCO ENV MOD DEPTH	
5	: DCO PULSE PW/PWM DEPTH	
6	: b02 : DCO PWM RATE	
7	: b03 : VCF CUTOFF FREQ	
8	: b04 : VCF RESONANCE	
9	: b05 : VCF ENV MOD DEPTH	
10	: b06 : VCF LFO MOD DEPTH	
11	: b07 : VCA LEVEL	
12	: b08 : LFO RATE	
13	: b09 : LFO DELAY	
14	: b10 : ENV T1	
15	: b11 : ENV L1	
16	: b12 : ENV T2	
17	: b13 : ENV L2	
18	: b14 : ENV T3	
19	: b15 : ENV L3	
20	: b16 : ENV T4	
21	: b17 : *** : TONE NAME - 1	
22	: b18 : *** : TONE NAME - 2	
23	: b19 : *** : TONE NAME - 3	
24	: b20 : *** : TONE NAME - 4	
25	: b21 : *** : TONE NAME - 5	
26	: b22 : *** : TONE NAME - 6	
27	: c 1 c 0 : TONE NAME - 7	
28	: c 3 c 2 : TONE NAME - 8	
29	: c 5 c 4 : TONE NAME - 9	
30	: c 7 c 6 : TONE NAME - 10	
31	: 0 (dummy)	

*** : 0, ignored if received

Notes :

Parameter	# Function	Value
0 DCO ENV MODE		0 = ENV normal 1 = ENV inverted 2 = ENV normal with dynamics 3 = ENV inverted with dynamics
1 VCF ENV MODE		0 = ENV normal 1 = ENV inverted 2 = ENV normal with dynamics 3 = dynamics
2 VCA ENV MODE		0 = ENV 1 = GATE 2 = ENV with dynamics 3 = GATE with dynamics
3 DCO WAVEFORM	PULSE	0 - 3
4 DCO WAVEFORM	SAWTOOTH	0 - 5
5 DCO WAVEFORM	SUB	0 - 5
6 DCO RANGE		0 = 4' 1 = 8' 2 = 16' 3 = 32'
7 DCO SUB LEVEL		0 - 3
8 DCO NOISE LEVEL		0 - 3
9 HPF CUTOFF FREQ		0 - 3
10 CHORUS		0 = OFF 1 = ON
11 DCO LFO MOD DEPTH		0 - 127
12 DCO ENV MOD DEPTH		0 - 127
13 DCO AFTER DEPTH		0 - 127
14 DCO PW/PWM DEPTH		0 - 127
15 DCO PW RATE		0 = PW manual 1 = 127 = PWM LFO RATE
16 VCF CUTOFF FREQ		0 - 127
17 VCF RESONANCE		0 - 127
18 VCF LFO MOD DEPTH		0 - 127
19 VCF ENV MOD DEPTH		0 - 127
20 VCF KEY FOLLOW		0 - 127
21 VCF AFTER DEPTH		0 - 127
22 VCA LEVEL		0 - 127
23 VCA AFTER DEPTH		0 - 127
24 LFO RATE		0 - 127
25 LFO DELAY TIME		0 - 127
26 ENV T1		0 - 127 (ATTACK TIME)
27 ENV L1		0 - 127 (ATTACK LEVEL)
28 ENV T2		0 - 127 (BREAK TIME)
29 ENV T2		0 - 127 (BREAK LEVEL)
30 ENV T3		0 - 127 (DECAY TIME)
31 ENV L3		0 - 127 (SUSTAIN LEVEL)
32 ENV T4		0 - 127 (RELEASE TIME)
33 ENV KEY FOLLOW		0 - 127
34 CHORUS RATE		0 - 127
35 BENDER RANGE		0 - 12

36 - 45
TONE NAME

Byte	TONE NAME	0 - 63 (TONE NAME table)
0 = A	16=Q	32=g 48=w
1=B	17=R	33=h 49=x
2=C	18=S	34=i 50=y
3=D	19=T	35=j 51=z
4=E	20=U	36=k 52=o
5=F	21=v	37=l 53=e
6=G	22=w	38=m 54=z
7=H	23=y	39=n 55=3
8=I	24=Y	40=o 56=4
9=J	25=Z	41=p 57=5
10=K	26=a	42=q 58=6
11=L	27=b	43=r 59=7
12=M	28=c	44=s 60=8
13=N	29=d	45=t 61=9
14=O	30=f	46=u 62=space
15=P	31=f	47=v 63=-

46,47 reserved

48 TONE MODIFY	(ignored if received)	0 = ENV TIME (increment) 1 = BRILLIANCE (increment) 2 = MOD DEPTH (increment) 3 = MOD RATE (increment) 16 = ENV TIME (decrement) 17 = BRILLIANCE (decrement) 18 = MOD DEPTH (decrement) 19 = MOD RATE (decrement)
----------------	-----------------------	--

Switch bit

b00	CHORUS	0 = OFF 1 = ON
b01 b02		DCO ENV MODE ENV normal ENV inverted ENV normal with dynamics ENV inverted with dynamics
b03 b04		VCF ENV MODE ENV normal ENV inverted ENV normal with dynamics dynamics
b05 b06		VCA ENV MODE ENV GATE ENV with dynamics GATE with dynamics

b07 b08 b09

b07 b08 b09	DCO WAVEFORM	0
b08 b09	SUB	1
b09	1 0	2
b09	1 1	3
b09	0 0	4
b09	1 0	5

b10 b11 b12

b10 b11 b12	DCO WAVEFORM	0
b11 b12	SAWTOOTH	1
b11	0 1 0	2
b11	0 1 1	3
b11	1 0 0	4
b11	1 0 1	5

b13 b14

b13 b14	DCO WAVEFORM	0
b14	PULSE	1
b14	0 1	2
b14	1 0	3
b14	1 1	4

b15 b16

b15 b16	HPF CUTOFF	0
b16	FREQ	1
b16	0 1	2
b16	1 0	3
b16	1 1	4

b17 b18

b17 b18	DCO RANGE	4'
b18	0 0	8'
b18	0 1	16'
b18	1 0	32'
b18	1 1	48'

b19 b20

b19 b20	DCO SUB	0
b20	0 0	1
b20	0 1	2
b20	1 0	3
b20	1 1	4

b21 b22

b21 b22	DCO NOISE	0
b22	0 0	1
b22	0 1	2
b22	1 0	3
b22	1 1	4

c7 c6 c5 c4 c3 c2 c1 c0

c7 c6 c5 c4 c3 c2 c1 c0	CHORUS RATE
v v v v v v	vvvvvv = 0 - 127

4. RECOGNIZED EXCLUSIVE MESSAGES

*Received if EXCL in the MIDI function is on.

4.1 All Tone Parameters without Tone names (APR)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0101	Operation code = APR (all parameters)
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 0010 0000	Level # = 1
g 0000 0001	Group #
h 0vvv vvvv	Value (0 - 127)
:	In sequence (36 bytes total)
i 1111 0111	End of System Exclusive

4.2 Bulk Dump (BLD)

Bulk Dump has no relation with the EXCL in the MIDI function.
When the 'DATA TRANSFER Button', 'WRITE Button' and 'BULK LOAD Button' are pressed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0011 0111	Operation code = BLD (bulk dump)
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 0010 0000	Level # = 1
g 0000 0001	Group #
h 0000 0000	Extension of program #
l 00pp pppp	Program #
j 0000 tttt	Some sets of TONE data
:	
k 1111 0111	End of System Exclusive

Notes :
The Program # is recognized as the first TONE number of the TONE data sets.
32 bytes are recognized as a set of TONE data.
TONE data is received in four-bit nibbles, right justified, least significant nibble received first.
See 3.3 Bulk Dump, to understand the TONE data format.

4.3 Other Exclusive messages are described in section 3.

5.1.5 End of file (EOF)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0100 0101	Operation code = EOF
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 1111 0111	End of System Exclusive

5.1.6 Communication error (ERR)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0100 1110	Operation code = ERR
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 1111 0111	End of System Exclusive

5.1.7 Rejection (RJC)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0100 1111	Operation code = RJC
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 1111 0111	End of System Exclusive

5.2 Sequence of communication

5.2.1 In the 'Dump' mode.

this unit	message	objective unit
WSF ----->		<---- ACK or (RQF)
DAT ----->		<---- ACK
:		:
DAT ----->		<---- ACK
EOF ----->		<---- ACK

5.2.2 In the 'Load' mode.

this unit	message	objective unit
(<---- WSF ACK ----->)		
<---- DAT ACK ----->		
:		:
<---- DAT ACK ----->		
<---- EOF ACK ----->		

Notes :

* This unit sends RJC and the sequence is discontinued when it receives ERR or detects some error.

* This unit sends RJC when the sequence is discontinued manually.

* This unit stops the sequence if the unit receives RJC.

5. HANDSHAKING COMMUNICATION

5.1 Message type

5.1.1 Want to send a file (WSF)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0100 0000	Operation code = WSF
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 1111 0111	End of System Exclusive

5.1.2 Request a file (RQF)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0100 0001	Operation code = RQF
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 1111 0111	End of System Exclusive

5.1.3 Data (DAT)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0100 0010	Operation code = DAT
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 0000 tttt	4 sets of TONE data (256 bytes)
g 0sss ssss	Check sum
h 1111 0111	End of System Exclusive

Notes :

TONE data is sent in four-bit nibbles, right justified, least significant nibble sent first.
See 3.3 Bulk Dump, to understand the TONE data format.

Summed value of the all bytes in data and the check sum must be 0 (7bits).

5.1.4 Acknowledge (ACK)

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0100 0011	Operation code = ACK
d 0000 nnnn	Unit # = MIDI basic channel, nnnn = 0 - 15 where nnnn + 1 = channel #
e 0010 0011	Format type (JU-1,JU-2)
f 1111 0111	End of System Exclusive



Roland Corporation Service Center

SERVICE NOTES

Issued by RJA

ERRATA & SUPPLEMENT

/ サービスノート正誤表 & 追加情報

1996-11-28

JU-1/HS-10

ER00181

Part number error. Please amend all existing service notes as follows.

/ パーツコードに誤記がありました。該当サービスノートを下記のように訂正して下さい。

Page 1 **PHOTO : JU-1
 : HS-10**

WRONG / 誤 :

TACT SWITCH SKHAD039A
(13169633)

CORRECT / 正 :

→ KEY SWITCH WK2A44 3A
(13129704)

KEY SWITCH WK2A44 3A
(13129704)

→ TACT SWITCH SKHAD039A
(13169633)